UNIVERSITY OF CALIFORNIA

Santa Barbara

The Evolutionary Economics of Intermarriage

A dissertation submitted in partial satisfaction of the

requirements for the degree Doctor of Philosophy

in Anthropology

by

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June 2022

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ACKNOWLEDGEMENTS

Primeramente, les agradezco a la gente de Santa Ana de Mosetenes y a los pueblos Moseten y Tsimane. Por cada uno de mis logos académicos, tengo una deuda de gratitud enorme a Ustedes. Nunca podré agradecerle lo suficiente por su participacion en mis investigaciones, y por hacerme sentir tan bienvenida en sus casas y sus vidas. Esta tesis doctoral no hubiera sido posible sin el arduo trabajo, los consejos valuosos y la Amistad de mis ayudantes de investigación Yasmani Chinica Vani y Sintia Canare Josecito. Estoy también muy agradecida a Julia Lipa Bascope y Olver Canare Josecito por su inquebrantable apoyo y amistad.

I would like to thank my advisor and friend Dr. Michael Gurven for all the opportunities, training, advice and support he has given me throughout my undergraduate and graduate careers. Attending his *Evolution of Cooperation* course as an undergraduate sparked my desire to conduct fieldwork, my curiosity for big questions, and my passion for evolutionary anthropology. During my doctoral training, Mike has always pushed me to excel while fostering an incredibly enjoyable and supportive work environment (including R and HT!). His faith in me will certainly and forever remain a reason why I strive to become a better scientist, fieldworker and mentor.

My work with the Moseten and the Tsimane would not be possible without the tireless efforts of my committee member Dr. Hillard Kaplan who has provided much support with fieldwork logistics, and valuable advice on field methods and research design. Hilly has also taught me two important lessons: 1) Behind good

anthropological science lays a genuine care and love for people; and 2) That there are always new perspectives to be gained and exciting paths to be explored by (literally) stepping outside. I will dearly miss our long walks and conversations.

My utmost thanks to committee members Dr. David Lawson and Dr. Thomas Kraft. Their work has greatly influenced much of my research interests and questions. And their advice and unwavering support have been unmeasurable, especially in the last few months of writing my dissertation. I am particularly grateful for the networking opportunities David has opened up for me, and for Tom's patience and generosity with his time. I owe much of my programming and statistical chops to him.

I must also thank Steven Gaulin, to whom I am greatly indebted for years of mentoring, both in teaching and in learning to find wonder, awe and beauty in the scientific understanding of the natural world. Thank you also to a number of faculty and colleagues who played integral roles in my professional and intellectual development: Chris von Rueden, Jonathan Stieglietz, Anne Pisor, Aaron Blackwell, Michelle Brown, Amy Boddy, John Tooby, Raz Davison, Nicole Thompson-Gonzalez, Stacey Rucas, Adrian Jaeggi, Lisa McAllister, Ben Trumble, Helen Davis, Paul Hooper, Melanie Martin, Daniel Redhead, Daniel Cummings, Angela Garcia and Gandhi Yetish. I am particularly grateful for Gandhi, Angela and Dan's friendship, wonderful fieldwork memories, and emotional support in the last few months of writing my dissertation.

Muchas gracias a todos mis colegas del Proyecto de Salud y Antropología en Bolivia y en los Estados Unidos, en especial a Roberta Méndez y Carmen Mavis por su apoyo, patiencia, y consejos valuosos.

I owe a great deal of gratitude to my fellow IAS cohort members Amy Anderson, Elizabeth Agey, Carmen Hové, and (honorary cohort member) Ronnie Bailey-Steinitz. Thank you for your friendship, feedback and advice on my work (and personal matters!), and for the opportunity to learn so much from you.

From my BA to my PhD, the Department of Anthropology at UCSB, and the IAS wing in particular, has provided an incredibly supportive and intellectually stimulating environment that I am honored to be a product of. I am particularly grateful to graduate advisor Karen Shultz, thanks to whom I rarely had to worry about finding teaching assistantships or missing important deadlines. UCSB will forever remain my alma mater and a place I associate with proud achievements and happy memories.

A million thanks to my biological and adoptive families in Morocco, France and the United States. *En anglais, on dit qu'il faut tout un village pour élever un enfant. Au maroc, j'ai eu la chance de grandir au sein d'une très grande famille unie et d'avoir plusieurs grand-parents, parents, et frères et soeurs de Coeur que je ne nommerai pas un par un (car la liste est plus longue que ma thèse doctorale…) mais qui se reconnaîtront.* To Paul, Alice and Luke Seabright, Isabelle Daudy and Sam Baron, thank you for your unwavering support, friendship, caring love, and for making me feel like I have always been part of your family. Thank you also to Lisa, Mike, Evie and Oliver for making me an honorary member of the Gurven-Baum

gang. I am incredibly grateful to my BFF, Sarah Carswell, who helped me overcome many hardships and taught me how to better take care of myself.

This dissertation is dedicated to my mother, who shared with me her desire to understand why people do the things they do; my grandparents Papou and Yemma who, each in their unique way, instilled in me a deep interest in the pursuit of knowledge; my siblings and partners in crime Sophia and Kamil for being my role models despite their younger age; and to my colleague, fieldwork companion, friend and love of my life Edmond.

Finally, I'd like to gratefully acknowledge financial support for this research from the National Science Foundation (#DDRIG- 2017527).

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2018 Sznycer, D., Xygalatas, D., Agey, E., **Alami, S.**, An, X.-F., Ananyeva, K. I., Atkinson, Q. D., Broitman, B. R., Conte, T. J., Flores, C., Fukushima, S., Hitokoto, H., Kharitonov, A. N., Onyishi, C. N., Onyishi, I. E., Romero, P. P., Schrock, J. M., Snodgrass J. J., Sugiyama, L. S., Takemura, K., Townsend, C., Zhuang, J.-Y., Aktipis, C. A., Cronk, L., Cosmides, L., & Tooby, J. Cross-cultural invariances in the architecture of shame. *Proceedings of the National Academy of Sciences,115(39)*, *9702–9707*.

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ABSTRACT

The Evolutionary Economics of Intermarriage

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Sarah Alami Gouraftei

Intermarriage is a primary driver of gene flow and cultural exchange in our species. However, despite strong interest in kinship, exchange and intergroup relations, the potential role of intermarriage has not been systematically studied nor its importance highlighted in the evolutionary social sciences. Core questions to consider include: What drives individuals to marry outside their cultural group? What socioecological conditions may lead to norms favoring marriage within vs. outside one's cultural group? And what consequences does intermarriage have on interpersonal and intergroup relations? This dissertation addresses the above questions in the context of a multiethnic village located at the intersection of the Amazon and the Andean highlands of Bolivia, where resource access and production strategies vary between indigenous Moseten and first- or second-generation Aymara-Quechua migrants.

First, I find ethnicity is an important factor in the choice of marriage partners and marital stability. Further, intermarriage between Moseten women and Highlander men may be driven by socioeconomic resource exchanges, whereby

Moseten women leverage their privileged access to arable land in tribal territory to attract wealthier Highlander men.

Secondly, I leverage a localized crop failure event in 2016-2017 to investigate whether interethnic marriage fulfills a risk management function. Consistent with ethnographic evidence that other forms of exogamy (e.g., intercommunity marriage) help buffer resource shortfalls in high-risk settings, I find that intermarried Moseten-Highlander couples are better able to recover from the economic impacts of crop failure. Their greater resilience is likely due to more diverse production strategies and reliance on remittances from larger extra-community social support networks.

Thirdly, I investigate how the presence of intermarried couples and their progeny, being of mixed ethnicity, affects the community's social networks, attitudes towards diversity, and the salience of ethnic identities. I find intermarried individuals to be well-integrated into the study community's networks and act as bridges between different ethnic groups. Although my findings suggest positive effects of intermarriage as a potential accelerator of integration, I find mixed effects on its potential to erode negative attitudes between groups.

In sum, this dissertation suggests that resource exchange and risk buffering may, at least in part, drive intermarriage in multicultural societies where resource access, production strategies and social networks vary between groups. Accordingly, intermarriage may be tolerated and widespread even in contexts where markers of group identity, such as ethnicity, remain important factors in the choice of marriage partners.

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1 INTRODUCTION

Intermarriage is a primary driver of gene flow and cultural exchange in our species. Over the past two decades, the advent of next-generation DNA sequencing has led to breakthrough discoveries of large amounts of gene flow between modern human populations (Bentley et al., 2009; Nielsen et al., 2017), and with other hominins (Massilani et al., 2020; Sankararaman et al., 2014; Villanea & Schraiber, 2019). While it is difficult to characterize the nature of interactions between our species and others within the hominin metapopulation, there is ample evidence of intermarriage between members of culturally distinct past human populations (Johnson et al., 2014; Mills, 2018; Pakendorf et al., 2003). However, despite strong interest in kinship, exchange and intergroup relations, the potential role of intermarriage has not been systematically studied nor its importance highlighted in the evolutionary social sciences. Core questions to consider include: What drives individuals to marry outside their cultural group? What socioecological conditions may lead to norms favoring marriage within vs. outside one's cultural group? And what consequences does intermarriage have on interpersonal and intergroup relations?

This dissertation addresses the above questions in the context of a multiethnic village located at the intersection of the Amazon and the Andean highlands of Bolivia. In this introduction, I present my theoretical framework, the hypotheses to be investigated, the ethnographic context where this study was conducted, and a description of data collection protocols and data collected.

1.1 MARRIAGE AND INTERGROUP RELATIONSHIPS

Although family arrangements are diverse across human societies, marriage is a universal phenomenon that can be broadly defined as a socially recognized union between two or more individuals (Fortunato, 2015). Marriage generally involves at least some degree of economic cooperation between the spouses (Fortunato, 2015; Gurven et al., 2009), and investment of material and social resources in joint children (if children are produced) (Fortunato, 2015; Gurven et al., 2009; Mattison et al., 2014). Importantly, this bioeconomic partnership between spouses also leads to agnatic relationships between their respective families, a hallmark of our species (Chapais, 2010, 2013), perhaps shared with other hominins (Hayden, 2012; Stepanchuk, 2018). The extended kinship bonds that marriage creates have long been considered the foundational blocks of human social organization (Lévi-Strauss, 1949; Rodseth & Wrangham, 2004), as they lead to between-group alliances and supra-group levels of social organization (Chapais, 2009, 2010, 2013).

Cross-culturally, choice of marriage partners results from three forces: the personal preferences of individuals, the influence of third parties and resulting norms and institutions, and the constraints of marriage markets (Kalmijn, 1998). When culturally distinct human populations come into contact with each other for an extended period of time, new challenges and opportunities may arise for individuals and/or families seeking prospective marriage partners. Marriage systems may subsequently adapt as individuals navigate trade-offs between expanding their kinship networks to include members of culturally different groups and reinforcing

their existing ties with members of their own cultural group(s). Analogous dynamics are well documented in culturally homogeneous small-scale societies. Community exogamy [vs. endogamy] – the practice of marrying outside [vs. inside] one's natal community (Durkheim, 1965; Lévi-Strauss, 1949)- is a well-studied dimension of marriage systems in small-scale societies. Community exogamy and endogamy are akin to dispersal and philopatry in other mating systems found in nature. Like dispersal, community exogamy prevents inbreeding depression and competition over limited resources between kin in small groups (Arciero et al., 2020; Clutton-Brock, 1989; Van Den Berghe, 1983), while philopatry and community endogamy result from kin selection and the defense of communal resources (Clutton-Brock & Lukas, 2012; Greenwood, 1980; Shenk et al., 2016) .

Unlike other animals, however, human groups are not necessarily spatially bounded (Cohen, 2012). Instead, their boundaries are also defined through delineations of in-groups and out-groups by individuals who consider themselves members (Cohen, 2012; Tooby & Cosmides, 2010).These delineations can be shifted when the net benefits of forging new cooperative relationships with out-groups outweigh the costs of disinvesting in existing ones with in-groups (Cohen, 2012; Pisor & Gurven, 2016). Thus, in addition to being a response to mate scarcity in small groups (Dow et al., 2016), community exogamy can fulfill additional functions for humans. These include defusing tensions or forging and maintaining alliances between communities under conditions that create the need to reach out beyond existing cooperative networks within the community, such as resource shortfalls (Kelly, 2013; Lee, 1984; Rosenzweig, 1989) or warfare (Chagnon, 1968;

Dow et al., 2016; Macfarlan et al., 2018). For example, under peaceful conditions, Yanomamo horticulturalists of Brazil and Venezuela follow a bilateral cross-cousin marriage system whereby pairs of lineages residing in the same village are continually allied through the reciprocal exchange of marriage partners (i.e., reciprocal lineage exogamy) establishing a pattern of village endogamy. However, when conflicts between villages arise, so does the need to form marriage alliances outside the village to either defuse tensions or cement alliances, resulting in a pattern of reciprocal exogamy between villages (Chagnon, 1968).

Despite sharing many similarities, community exogamy and intermarriage between members of culturally distinct groups vary in one important way. Unlike intermarriage, community exogamy between culturally homogeneous groups does not cross (formal or informal) institutional boundaries (i.e., linguistic, ethnic, and religious boundaries), as these tend to be shared by members of different communities belonging to the same ethnicity and/or religion. And while community exogamy has likely existed for much of our evolutionary history, intermarriage may have only become more prevalent with the rise of sedentism in the late Pleistocene (Singh & Glowacki, 2021; Sterelny, 2016) and the use of identity markers for choosing social partners in higher density populations (Pisor & Ross, 2021; Smaldino, 2019).

Understanding the drivers and consequences of intermarriage is crucial for elucidating debates in evolutionary anthropology, archaeology and genetics about the nature of interactions between Neolithic farmers and hunter-gatherers (Bentley et al., 2009; Diamond & Bellwood, 2003), and perhaps even interactions between

our species and other members of the Hominin family (Herrera et al., 2009; Tostevin, 2003). As contemporary small-scale societies increasingly integrate within regional and national societies and more globalized markets, new opportunities for interactions between members of different linguistic, ethnic and religious groups raise questions about the cultural survival of groups traditionally studied by anthropologists. Concurrently, it also provides novel opportunities for studying a wide range of intergroup dynamics (Gurven, 2018; Jones, 2016; Reyes-García, 2016), further highlighting the need to conduct research on intermarriage, the most intimate form of intergroup relationship.

To date, most research on intermarriage comes from the field of sociology and has primarily been conducted in industrialized populations. The earliest research on the topic dates back to the early to mid-20th century and was motivated by the question of whether ethnic and religious minorities would assimilate to the predominant group, or integrate with one another, in countries with high levels of immigration and a history of slavery such as the United States (Drachsler, 1920; Kennedy, 1944) and Brazil (Telles, 1993, 2014). For example, in his essay on Assimilation in American Life (Gordon, 1964), Milton Gordon noted how early migrants from Southern and Eastern Europe, who faced a great deal of discrimination when they first arrived in the United States in the early 20th century, had assimilated into the already established white ethnic majority three generations later, and argued that this assimilation was both a cause and a consequence of widespread intermarriage. Ever since, intermarriage rates have become a commonly used indicator of minority integration (Qian & Lichter, 2007; Rodriguez

Garcia, 2015; Song, 2009). High rates of intermarriage are believed to indicate that members of different groups perceive and accept each other as social equals, and thus acts as a barometer of the state of intergroup relations; conversely, high rates of cultural endogamy or homogamy in multiethnic countries are believed to indicate that an important level of socioeconomic inequality and/or mistrust subsists between groups (Qian & Lichter, 2007; Rodriguez Garcia, 2015; Song, 2009). Research on interreligious marriage similarly considers tolerance for interfaith marriages to reflect the extent to which religious authorities control the life choices of their members, which is itself a product of the salience of religious identity (as opposed to other identity markers) (Seamon, 2012; Sherkat, 2004). Thus, in much of the sociology literature, with a few notable exceptions (see review in Kalmijn, 1998), intermarriage is primarily viewed as a lagged indicator of increased interactions and improved intergroup relations (Qian & Lichter, 2007; Rosenfeld, 2005; Seamon, 2012).

However, the drivers of intermarriage likely extend beyond fading group boundaries. There is ample evidence that intermarriage can take place between very distinct and sometimes even competing groups in historical (Chin, 2010; Deardorff, 2017; Sutter Fichtner, 1976), industrialized (DellaPergola, 2017; Scheck, 2018; Smits, 2010) and contemporary small-scale populations (Ekiru, 2011; Terashima, 1987). Intermarriage remains costly for the individuals involved, who may face a higher risk of divorce, even in societies where intermarriage is widely accepted (Bratter & King, 2008; Kalmijn et al., 2005). Further, intermarriage may itself challenge group boundaries by bringing together families and networks of

individuals from different cultural backgrounds (Goldstein, 1999; Kearns & Leonard, 2004), and by producing children who identify with multiple groups (Kalmijn, 2010).

In the following chapters, I investigate what motivates individuals to intermarry across ethnic groups, and what consequences does intermarriage bear for the spouses and the groups involved. In chapter 1, I test the hypothesis that individuals strategically seek marriage partners outside their ethnic group to gain or improve access to critical resources when these vary between groups. In chapter 2, I test the hypothesis that intermarriage is a risk management strategy that results in greater economic diversification and resilience to shocks for intermarried households. Finally, in chapter 3, I explore the consequences of intermarriage on intergroup relations, social cohesion and minority integration.

1.2 ETHNOGRAPHIC SETTING

The study takes place in a multiethnic village located in the Alto Beni region of Bolivia, selected for its ethnic and cultural diversity and the important role intermarriage plays in the building and maintenance of interethnic relations. Below I provide relevant information about ethnic relations and their role in Bolivian politics, the ethnic composition and interethnic relations in Alto Beni, an ethnographic description of the study community and my definition of intermarriage in the context of this study.

Ethnic identity and politics of indigeneity in Bolivia. Ethnic identity and indigeneity are central features of the national discourse in Bolivia. Bolivia is one of the most ethnically diverse countries in the world. It has a larger indigenous

population than the majority of countries in Latin America, with 36 nationally recognized indigenous groups (*pueblos originarios*), in addition to non-indigenous European and Afro-descendant populations. After centuries of exclusion from the country's political life, the 1980s and 1990s saw a rise of grassroot organizations and movements advocating for indigenous rights, many of which were originally founded by members of peasant and labor unions mobilized during the 1952 national revolution, but later disillusioned by its outcomes (Anria, 2013; Madrid, 2008). Some of these movements evolved to become political parties such as the Movement for Socialism (MAS) (Anria, 2013). In the early 2000s, the MAS party leveraged solidarity and coordination across various indigenous organizations to gain popularity and rise to power in 2006 under the leadership of Evo Morales, Bolivia's first indigenous president (Anria, 2013).

By 2009, Bolivia under Morales ratified a new constitution which formally recognized the rights of territorial integrity and self-governance to indigenous groups. It also embraced the language of *plurinacionalismo* (multi-nationalism) as its conceptual pillar (Anria, 2013; Molero Simarro & José Paz Antolín, 2012). The ensuing decade was characterized by government investments in social spending and accompanied by a sizable reduction in poverty and visible strides in social equality (Bohoslavsky, 2020). However, the government's effort to support marginalized indigenous communities has had mixed consequences (Bohoslavsky, 2020). MAS politicians have been blamed for rendering some forms of indigeneity more eligible for government benefits than others, favoring highland over lowland indigenous groups and mestizos, and disintegrating unity even among highland

groups (Bohoslavsky, 2020; Canessa, 2014). While common causes united indigenous organizations in the 1980s, 1990s and early 2000s, new conflicts of interest also got in the way. In 2010, for instance, the government announced plans (approved in 2017) for the construction of a controversial highway through the Isiboro Secure National Park and Indigenous Territory, which led various indigenous organizations to withdraw their support to MAS. One such organization that withdrew support is CIDOB (Confederation of Indigenous Peoples of Bolivia), which since 1982 represents the Moseten and 33 other indigenous groups living in the lowlands of Bolivia (Hirsch, 2019).

Ethnic makeup and interethnic relations in Alto Beni. Located in the transitional Yungas between the Andean highlands and the tropical lowlands, Alto Beni is a province of the La Paz department. There are >160 communities in Alto Beni, most of which are rural and characterized as *intercultural,* a designation used by the Bolivian government to recognize communities which are no longer on their traditional lands but are composed of various *pueblos originarios* (Albó & Barrios, 2006; Pisor & Ross, 2021). Various groups contribute to Alto Beni population diversity, but they can be broadly characterized as: Moseten, Highlanders and Lowlanders (von Stosch, 2010).

Moseten, the indigenous inhabitants of the region, are historically forager-farmers who were organized into missionary communities by Catholic priests in the late 18th and early 19th centuries (Castillo, 1988). Their population is concentrated in 10 communities which are all members of OPIM (*Organizacion del Pueblo Indigena Moseten*), itself organized under the umbrella of CIDOB, and responsible for the

negotiation of land rights over the Moseten indigenous territory in 2001, referred to legally as *Tierra Comunitaria de Origen* (TCO) *Moseten* (Zeballos, 2017). Moseten are the only population in Alto Beni to enjoy tribal land rights over a territory of ~ 100,000 hectares. Up to 20 hectares of arable land in TCO Moseten can be acquired for productive use (rented for an unlimited time) in exchange for a renting fee of 250 Bolivianos (Bs)s (~$37 USD), a minimal fee considering a hectare of arable land in the region is sold at ~1700 Bs (~$247 USD). However, agricultural rights are not typically awarded on the basis of Moseten ethnic identity; instead, they are awarded to individual members of OPIM irrespective of ethnic affiliation. For instance, many OPIM members, including the OPIM president from 2017-2019, do not have ethnic Moseten ancestry and do not speak the Moseten language. In fact, of OPIM's ten member communities, only four – including the current study community – are historical Moseten communities dating back to early colonization and missionization with a majority Moseten population. The others are majority Highlander and Lowlander communities with some Moseten presence.

From the 1950s onwards, Alto Beni has received a substantial flow of Aymara and Quechua immigrants from the Andes (hereby Highlanders), first in search for work in the *quina* industry, and then as part of a government program aimed at reducing Altiplano overpopulation by relocating families to the lowlands, as well as unemployed landless silver and tin miners working previously in Potosí and Oruro (Nobbs-Thiessen, 2016; von Stosch, 2010). Following improvements in road infrastructure in the 1970s, immigration to the region intensified (Nobbs-Thiessen, 2016; von Stosch, 2010). The majority of immigrants were themselves children of

Aymara and Quechua immigrants who moved to the neighboring Beni department prior to settling in Alto Beni. Highlanders still migrate to the region, attracted by its temperate climate, favorable agricultural conditions or the logging industry. They currently constitute Alto Beni's majority population (Nobbs-Thiessen, 2016; von Stosch, 2010). Although they are linguistically distinct groups, Aymara and Quechua in Alto Beni, and in other regions of South America (Moya & Boyd, 2015), do not conceive of themselves as such. In Alto Beni, they are highly intermarried to each other as exemplified by the large proportion of individuals with mixed Aymara-Quechua ethnic heritage in the study community (figure 1).

Finally, Lowlanders constitute a heterogeneous grouping that includes various indigenous (e.g., Trinitarios, Moxeños, Tacanas, Lecos, Guarani, Yuracare) and non-indigenous (i.e., Camba) populations who migrated to Alto Beni from lowland provinces, mainly the Beni and Santa Cruz departments (Nobbs-Thiessen, 2016; von Stosch, 2010). Most migration from the lowlands occurred from the 1960s to the 1990s as part of a messianic millenarianist movement in search of the *Loma Santa* ("Holy Hill") (von Stosch, 2010). While the various groups that constitute this category tend to view each other as ethnically distinct, the large majority of Lowlanders in the study community are themselves the result of mixed unions between the various ethnic groups that constitute this category (figure 1). Therefore, they are treated as an ethnically homogeneous group throughout this study.

Land encroachment, land use and competition over government resources are primary sources of conflict between residents of communities belonging to the TCO Moseten and residents of *intercultura*l communities (von Stosch, 2010). In

recent years, these conflicts have been exacerbated by the intensification of Highlander immigration to Alto Beni, the politization of indigeneity, and increased resource competition due to the COVID-19 pandemic. Nevertheless, relationships remain relatively peaceful and cooperative with conflicts rarely escalating to violence. Commercial and intermarriage ties are frequent between Moseten and *intercultural* communities, and intercommunity events such as soccer tournaments and *fiestas* provide opportunities for healthy competition and bonding between villages.

The study community. The focus of this dissertation is a rural village founded in the 19th century by Franciscan missionaries (Zeballos, 2017) (population ~800 in 2021). It is majority Moseten (48.8% in our sample) with important Highlander (24.2 %) and Lowlander (11.9%) populations, as well as populations of mixed Moseten-Highlander (6.8%), Moseten-Lowlander (7.8%) and Highlander-Lowlander (0.5%) ethnicities (figure 1). Despite its sizable non-ethnic Moseten population and the proximity of multiple *intercultural* communities, the study community has been able to maintain a strong sense of Moseten identity. Its residents have long been involved in the struggle for political recognition and invest heavily into preserving Moseten cultural heritage, for instance by effectively assimilating immigrants through intermarriage, and hosting events promoting Moseten culture including educational events, culture fairs and village *fiestas*.

Community members of all ages and ethnicities speak Spanish as a first or second language and practice Catholicism. They share the same public spaces including an elementary and secondary school and a health center, which are also

shared with a neighboring *intercultural* village (figure 2). Given the shared language and religion of resident ethnicities, the current study site is ideal for studying the role ethnicity alone plays in determining marital preferences, without the confounding effects of linguistic, religious, or other factors (chapter 1). Both Moseten and non-Moseten who are official members of the community have the same rights and civic duties. They are entitled to receive arable land in the TCO and may hold positions of political leadership within the village, although this is a point of contention among a few ethnic Moseten. However, becoming a recognized member of the study community (*timbrado*) – a necessary condition for obtaining agricultural rights in TCO Moseten – requires an application to the requisite leadership (OPIM and village leaders), who may consider the ethnic background of the applicant and their spouse as a factor in their final decision. Becoming *timbrado* is somewhat analogous to acquiring citizenship. Recognized members of the community are expected to defend Moseten interests, pay small taxes used to maintain public infrastructure, support elected community representatives, and participate in the democratic process of the community.

Non-ethnic Moseten are well integrated in the community often self-identifying as partially Moseten despite not having any Moseten ethnic origins. Highlanders, however, tend to be less assimilated to Moseten culture than Lowlanders, likely due to their larger group size and their greater cultural distance from Amazonian groups. The way individuals belonging to different ethnic groups perceive each other tends to reflect common Bolivian stereotypes about Lowlanders and Highlanders (Lopez Pila, 2014; Nobbs-Thiessen, 2016). Though they tend to be

praised for their strong work ethic, entrepreneurship and ability to accumulate material wealth, Highlanders are nonetheless often characterized in negative terms (e.g., "colonizers", "stingy", "closed-off") suggesting a certain level of mistrust. These feelings can be exacerbated when conflicts arise with neighboring *intercultural* communities, where Highlanders from the study community have family ties or social connections. Lowlanders are said to be friendly and warm, but lazy and frivolous. Moseten, who fall geographically at the intersection of the Andes and the Amazon are somewhere in between, sometimes described as hardworking and other times as lazy or unambitious. Thus, the study setting provides an opportunity to test whether intermarriage may improve attitudes towards ethnic minorities and diversity (chapter 3).

Most residents grow rice for personal consumption, but many sell the majority of their crops – especially papaya, cacao, citrus fruits, plantain and sweet manioc – in a neighboring market town (~13km from the study village) or in the country capital, La Paz (~250 km from the study village). Although residents of the study community are primarily small-scale farmers, resource access and subsistence strategies vary between groups, making it possible to test whether intermarriage can serve to provide access to new economic opportunities (chapter 1), and/or diversify the production strategies of couples (chapter 2). While being ethnically Moseten is not a pre-requisite for accessing land in communal territory, ethnic Moseten tend to be prioritized given their indigenous status and their establishment in the study community for generations. Non-Moseten are more likely to own land outside the TCO and tend to exploit their land more intensively, especially if they grow cacao for

commercial purposes and belong to *El Ceibo*, the largest cacao cooperative in Bolivia. Highlanders are also more likely to own a small business (i.e., small shops, *pensiones* (stores) and eateries) or work as a taxi driver. A common recent trend for younger individuals of all ethnic origins is to engage in wage labor and reside intermittently in neighboring towns, or to migrate to larger urban centers in search of better education and work opportunities.

Since 2016, villagers have been facing major crop failure in one of their most important cash crops, papaya, due to disease. As a result, reliance on other crops as well as other sources of income has increased in the past 5-6 years for papaya growers. Some residents are also relocating their papaya fields a few kilometers northeast, in an area which is also part of the TCO Moseten. We leverage this exogenous shock to production to test whether intermarriage helps buffer households against risk (chapter 2).

Residents of the study community, all origins included, do not always commemorate weddings with formal ceremonies but consider a pair to be married when they sleep together in the same house for an extended period of time. Teenagers may date while still residing with their respective families but all unions involving long-term cohabitation are recognized as marriages by third parties and the spouses themselves. This allows us to depart from most studies on intermarriage which focus exclusively on formal marriage, while ignoring long-term cohabitations, in spite of their increased occurrence. All unions are monogamous and there is no exchange of bride price or dowry, although informal bride service is common among ethnic Moseten. Divorce and remarriage are universally accepted,

and inheritance is bilateral for all groups. Deviations from the norm, however, are not uncommon among Highlanders who may favor older sons to avoid fragmenting land outside the TCO Moseten.

How is intermarriage identified*?* Throughout this study, marriage is defined as a long-term union between a co-residing woman and man. Unions between same gender individuals are not socially recognized in the study community, and thus are not investigated. Intermarriage is defined based on the ethnic origins of participants, i.e., their parent's ethnicity (as opposed to ethnic self-identification). There are three possible intermarriages: marriage between: (1) Moseten and Highlander, (2) Moseten and Lowlander, and (3) Highlander and Lowlander. Individuals whose parents are themselves intermarried are considered ethnically endogamous if they married an individual who belong to either of their parent's ethnic groups but intermarried if they married an individual who does not belong to either of their parent's ethnic group (~0.5% of participants).

1.3 DATA COLLECTION

Data collection took place between February and September 2021 and was conducted by Sarah Alami (SA) and two research assistants (RA): Sintia Canare Josecito (SCJ) and Yasmani Chinica Vani (YCV). Altogether, 92% of adults (N=376; 52.7% female) residing permanently in the study village were interviewed for this dissertation. Secondhand information about the missing 8% – individuals who were absent in the community due to temporary residence in town or other communities – was collected during interviews with spouses and/other family members, resulting in

a total sample size of 409 individuals (49.6% female) for a majority of interview questions. RAs were trained for a period of 1.5 months during which particular attention was dedicated to ensuring minimal interviewer differences, as well as minimizing biases related to perceptions of the interviewer's ethnic identities and beliefs about outgroup members. Due to travel restrictions during the COVID-19 pandemic, interviews were conducted either remotely by SA via the multiplatform messaging application *Whatsapp* (14.2% of interviews), or in person by YCV (39.6% of interviews) and SCJ (37.2% of interviews). RAs set-up a remote open-air research station to conduct interviews or interviewed participants outside their homes in open-air courtyards, always maintaining a safe distance and using personal protective equipment (figure 3). All interviews were conducted in Spanish, and in-person interviews were recorded for quality control if the participants gave their permission to record. Data were entered on tablets using the software *KoboToolbox*. Jessica Duran (JD), a Spanish speaking undergraduate student at UCSB helped SA code qualitative data and listen to interviews for quality control. Oral consent was obtained for all survey respondents.

Prior to conducting this study, SA spent ~1.5 months living in the study community in 2018 and conducted a pilot study on the topic of intermarriage and ethnic group relations with 98 participants. During that time, she developed trusting relationships with residents and community leaders. This experience allowed her to gain ethnographic insight crucial to the interpretation of study results.

Below we describe the data collected. Demographic characteristics of the adult village population are shown in table 1.

Age and education. Respondents were asked about their date of birth for calculating their age or an estimate of their age if their date of birth was unknown, as is the case for a few elders (table 1). Participants were also asked whether they received formal schooling, whether they were ever involved in literacy programs, and their highest level of schooling achieved. A *years of schooling* variable was estimated using these data (table 1).

Ethnic origins and self-identification. Participants were inquired about their community of origin, migration history and how long they have been living in the study community (table 1). To determine the ethnic origins of the respondents, we inquired about the ethnicity of each of their parents. To determine how participants prefer to self-identify, we showed them seventeen cards representing ethnic, regional, national, and supranational groups, and we started by asking them to select all groups they identify with. From this selection, they were then asked to choose only one group they feel they belong to the most (figure 4). Cards were shuffled and presented in a random assortment to participants to prevent order bias. Participants interviewed via *Whatsapp* were sent a photo of the cards and asked to list, in a similar fashion, the groups they identify with, then the group they identify with the most.

Marriage, intermarriages and divorce. Participants were inquired about their marital status (figure 5). If they have ever been married, they were also inquired about the name and age of their current or former partner(s) (including ex-spouses and deceased spouses), their age at marriage, that of their current and/or former spouse(s), their current and/or former spouse‘s ethnic origins, and the

number of children resulting from each union. Divorced respondents were inquired about the length of their relationship, and – in the form of an open-ended question– the main reasons they believe the relationship ended. SA then coded causes of separation into major relevant categories.

Household wealth. All participants, with the exception of young and single participants who still live with their parents, were asked about construction materials used to build their house and house amenities. Material assets were inventoried by asking heads of households whether any household members own any of a 15-item bundle of goods (e.g., televisions, motorbikes, fridges). Participants were also inquired about real estate, including houses and land owned in residential areas of other communities or towns. Market value of the house, household items, and real estate was estimated using local prices (~13km from the study community) with the help of RAs and the community *casique* (village leader), Mr. Olver Canare Josecito. Assets were summed into a single currency for each household to serve as a measure of wealth. If both spouses were interviewed, their estimates for household wealth were compared as a quality check. In case of major discrepancies (<2% of interviews), they were once again asked to repeat this section of the interview focusing on discrepant questions. The values estimated for husbands and wives were then averaged to generate our best proxy of household wealth. The same was done for income from agricultural sales in the following section.

Agricultural land rights and income composition. Agricultural rights in TCO Moseten and/or the purchase of arable land outside communal territory follows household formation in the study community. Thus, only heads of households (both

spouses) were inquired about agricultural land and income. Participants were asked to report the area and the location of land allocated to them in TCO Moseten, as well as the area and the location of agricultural land owned outside the TCO. They were then inquired about the number of crops cultivated, amounts sold for each crop and at what price over the past year. All participants were inquired about involvement in activities other than agriculture (e.g., taxi, wage labor) and their revenue from each source over the past year. Non-agricultural income was then summed between spouses.

Perceived socioeconomic mobility since marriage. Currently married participants were asked the following four questions, on a five-point Likert scale, aimed at determining their perceived socioeconomic mobility since marriage:

(1) *"Compared to before you were married, is it easier or harder to get money to buy groceries and other necessities?"*

(2) *"Compared to before you were married, how much better or worse are your living conditions? For example, how much more or less comfortable is your house? Does it have more or less amenities that make life easier?"*

(3) *"Compared to before you were married, how much better or worse are your working conditions?"*

(4) *"How optimistic are you about the economic future of your children?"*

Given the positive correlations between all four items (Pearson's r =0.3-0.7), a socioeconomic mobility score (*range*=-20 – 20) was calculated by summing across all items.

Economic shocks and risk management. Household heads were asked to estimate their average income from papaya sales in the year preceding the disease (2015). To facilitate recall, they were presented with bins of 500 Bolivianos (~72.5 USD) increments and asked to choose an amount that approximates how much they earned from papaya sales. Participants were then asked what percentage of their total annual income (including their income from both agricultural sales and other activities) did papaya represent during the year preceding the disease. Once again, to help with recall, participants were shown bins of 10% increments and asked to choose an amount that approximates the percentage of annual income resulting from papaya sales prior to the disease. These data were used to estimate the extent to which households were affected by the papaya disease, and combined with current data on household income composition, whether they have recouped their losses.

Social support networks. Participants were first asked to free-list social partners within and outside the community who provided them with five different types of social support over the past few months. They were then asked to free-list other individuals whom they have not previously named who could provide them with support if needed. I also asked participants to list any individuals who recently received their support along those five dimensions. The questions elicited (1) friendship and emotional support (i.e., close friends, casual conversation partners), (2) behavioral assistance (i.e., support with childcare, support with manual labor, food sharing), (3) financial assistance (i.e., loans and material support during the COVID-19 pandemic), (4) support in finding work, and (5) help with bureaucracy for

land access. Additionally, participants were asked to free-list (6) family and friends outside the community on whom they could rely for material assistance.

Attitudes towards diversity and ethnic minorities. Ethnic Moseten participants were presented with ten propositions designed to capture attitudes toward immigration to the Alto Beni, interethnic marriage, and the treatment of ethnic minorities in the study community. Using 5-point response scales, participants assessed their degree of agreement or disagreement with the propositions. Using principal component analysis, these propositions were grouped into five major categories, where higher values reflect more favorable responses: (1) Attitudes towards intermarriage; (2) Attitude towards immigration of Highlanders and Lowlanders to the region; (3) Attitudes towards minority rights in the community; (4) Attitudes towards ethnic diversity; and (5) Attitudes towards the consequences of ethnic identity on the preservation of Moseten culture.

Figure 1. Ethnic origins of the adult population in the study community (N=409; 49.6% female)

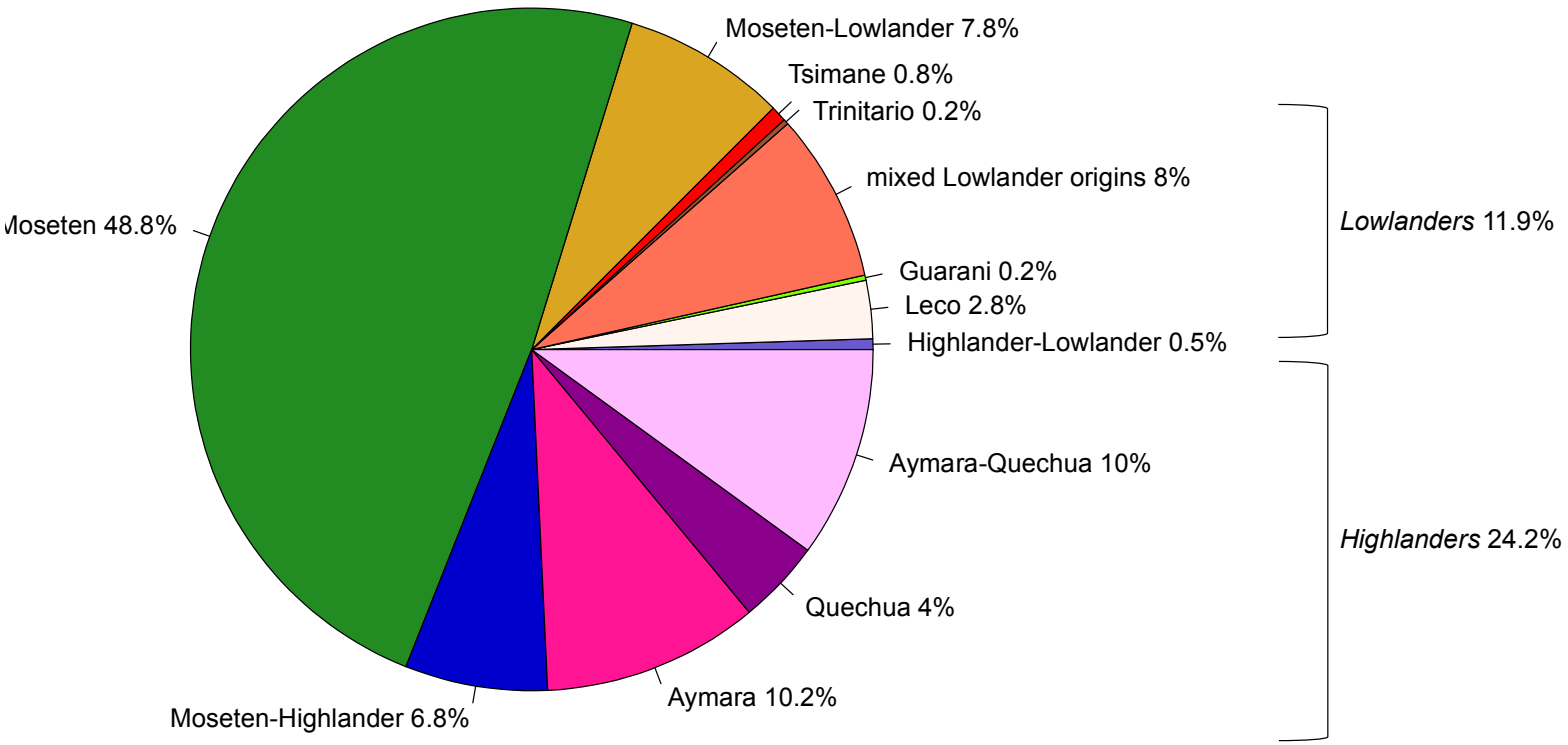

Figure 2. Map of the study community and a neighboring *intercultural* village.

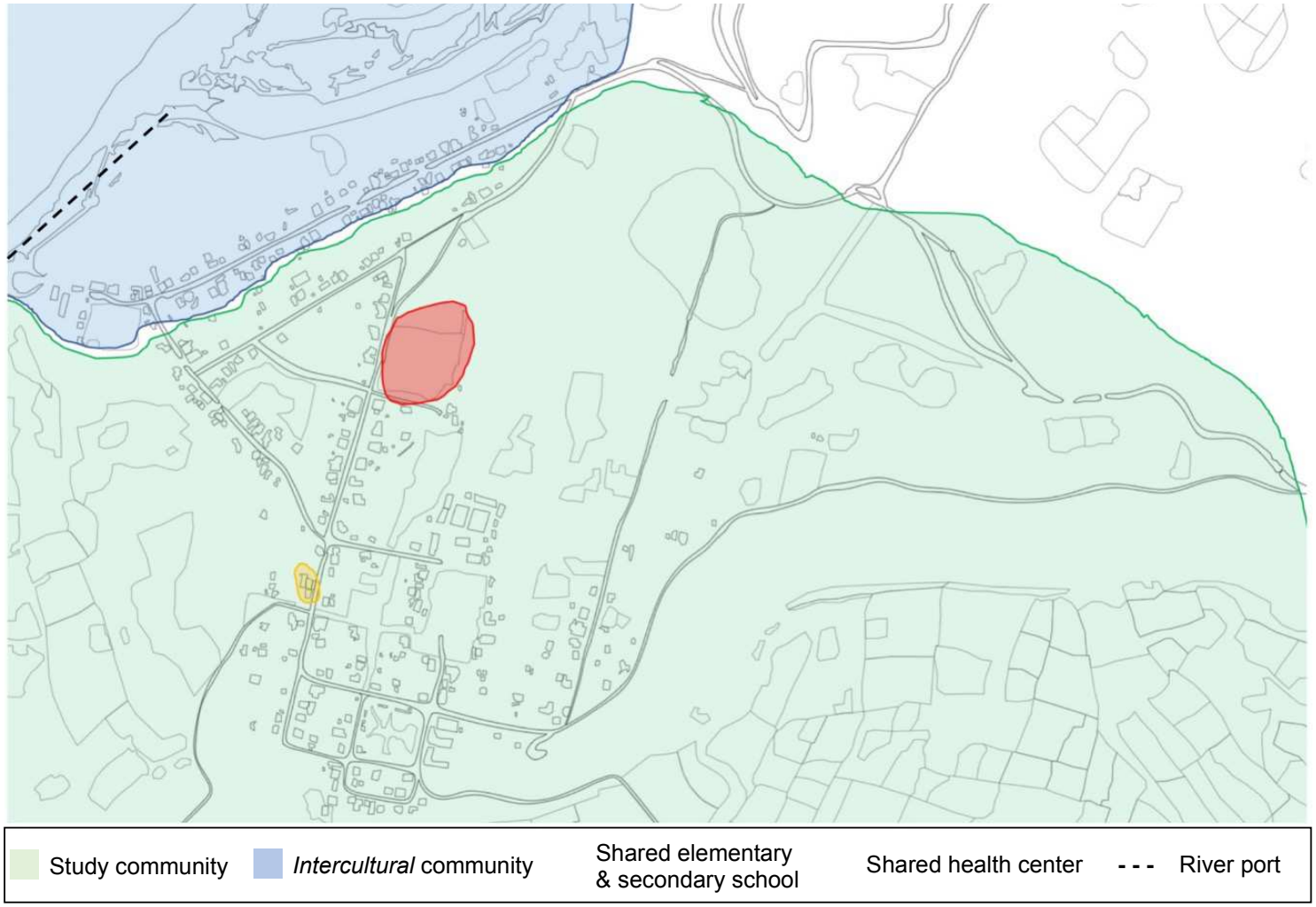

Figure 3. Fieldwork photos**. (A)** Research assistant Yasmani Chinica Vani (right) conducting an interview in the courtyard of a study participant's (left) home. **(B)** Research assistant Sintia Canare Josecito (left) and study participant (right) posing for a photo at the remote research station following an interview.

Figure 4. Preferred self-identity of study participants (N=376; 52.7% female)

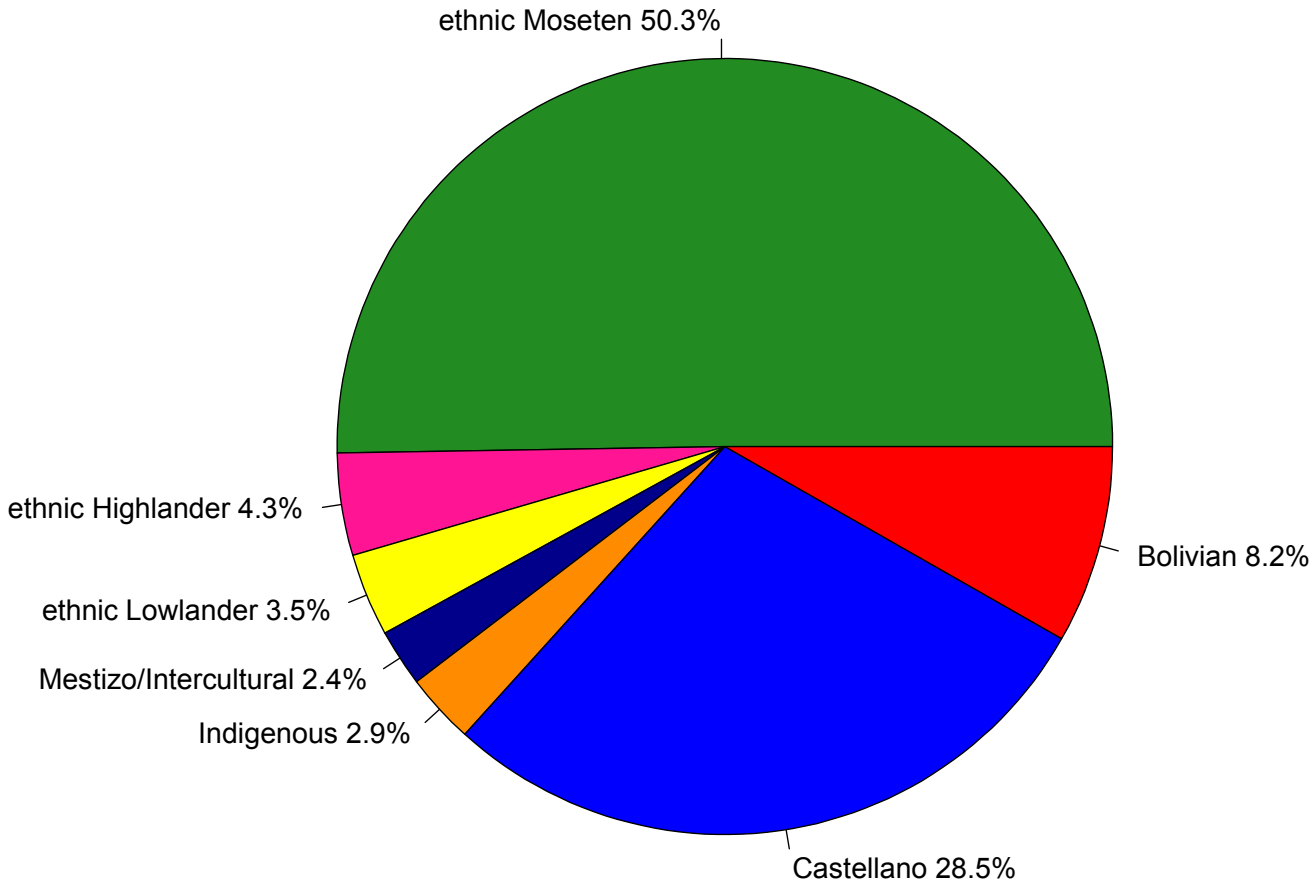

Figure 5. Marital status by sex and ethnicity (N=409; 49.6% female)

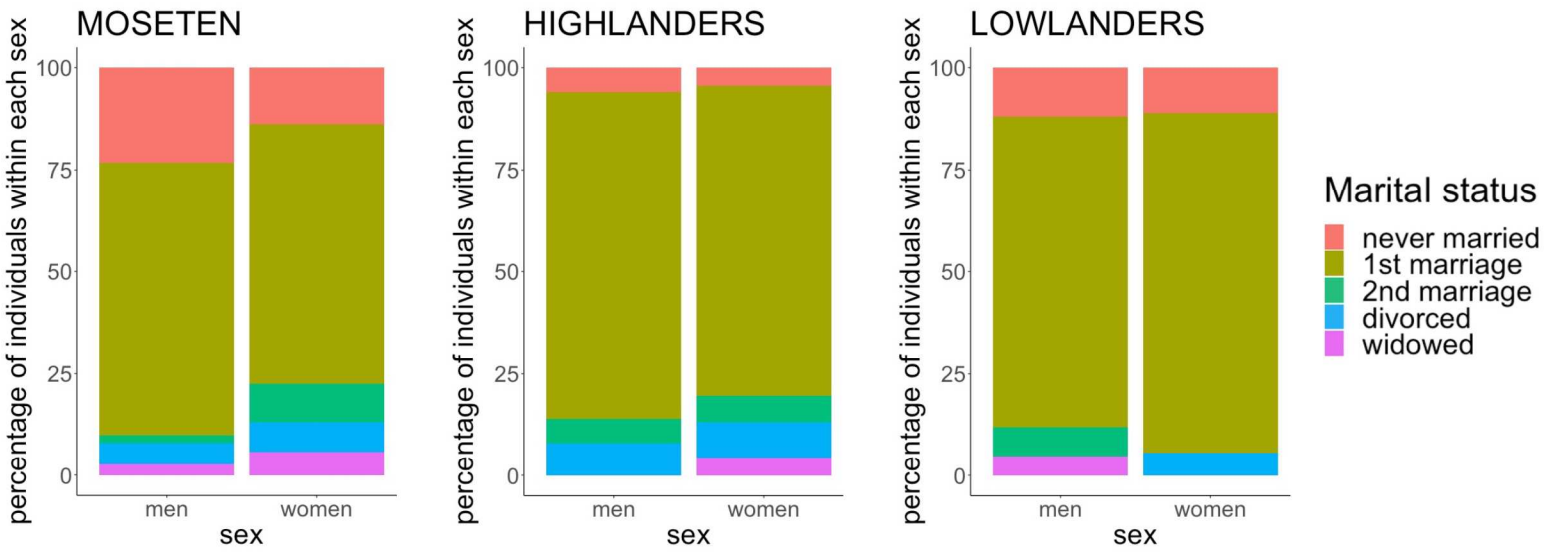

Table 1. Descriptive statistics. Descriptive statistics for individual level variables by ethnicity (N=409; 49.6% female) and household level variables (N=155 households).

	INDIVIDUAL LEVEL VARIABLES		
	Moseten (n=251)	**Highlanders** (n=98)	**Lowlanders** (n=60)
% Female	54.98%	47.96%	30.00%
Mean age in years (Sd)	37.85 (15.69)	40.46 (14.24)	36.94 (16.09)
Mean years of schooling (Sd)	7.57 (4.29)	8.33 (4.53)	8.68 (3.97)
Mean number of children (Sd)	3.16 (2.70)	3.14 (2.34)	2.55 (2.30)
% Native to the community	94.00%	22.68%	21.67%
	HOUSEHOLD LEVEL VARIABLES		
Median wealth	35,628BOB (2,500- 154,508)		
Median income from agriculture	9,889 BOB (0-75,278)		
Median income from other activities	19,416 BOB (0 -218,400)		

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2 DOES RESOURCE ACCESS DRIVE INTERETHNIC MARRIAGE? A TEST OF EXCHANGE THEORY IN RURAL BOLIVIA

ABSTRACT

Rates of marriage between individuals from different ethnic or religious groups are commonly regarded as an indicator of minority integration in multicultural contemporary societies. For the individuals involved, however, intermarriage is often fraught with various hardships and is more likely to end in divorce. What motivates individuals to consider intermarriage? Should intermarriage be simply regarded as a sign that group boundaries are fading, or are individuals strategically motivated to marry out despite the risks involved? Here, I examine patterns and drivers of interethnic marriage in a rural Bolivian village where mixed unions are widespread, and barriers to miscegenation minimized between indigenous Moseten, Aymara-Quechua Highlanders and groups native to the Bolivian Lowlands. I find ethnicity remains an important factor in the choice of marriage partners and marital stability. Further, intermarriage between Moseten women and Highlander men may be driven by resource exchanges, whereby Moseten women may leverage their privileged access to arable land in tribal territory to attract wealthier Highlander men. My results illustrate how intergroup variation in access to resources may drive intermarriage in small-scale societies.

2.1. INTRODUCTION

Marriage between individuals from different ethnic or religious groups is a core indicator of social mobility and minority integration in contemporary societies (Kalmijn, 1998; Qian & Lichter, 2007; Song, 2009). In the United States and Western Europe, where most studies on intermarriage have been conducted, marriage to the majority group is associated with better labor market integration and higher earnings for ethnic and racial minorities (Dribe & Nystedt, 2015; Furtado & Theodoropoulos, 2009; Meng & Gregory, 2005; Nottmeyer, 2010). In addition to reflecting greater acceptance of minority groups in multicultural societies, intermarriage is believed to weaken the rigidity of group boundaries as it connects not only spouses of different cultural backgrounds, but also their families and networks (Goldstein, 1999; Kearns & Leonard, 2004). Intermarriage also produces children with a multicultural heritage who interact more frequently across groups, adopt more fluid cultural identities, and tend to choose marriage partners from the majority group more often (Brunsma, 2005; Kalmijn, 2010a; Lichter & Qian, 2018; Tomás, 2020).

For the individuals involved, however, marrying out is often fraught with various hardships, and is more likely to end in divorce (Bratter & King, 2008; Kalmijn et al., 2005). Risks associated with intermarriage include communication issues and conflicts arising from cultural differences between the spouses (Kalmijn et al., 2005; Smith et al., 2012), alienation and rejection by in-laws or peers (Bratter & Eschbach, 2006; De Miguel Luken et al., 2015), power imbalances within the couple that can

result in greater risk of spousal abuse (Kusel, 2014; Nemoto, 2006), and erosion of one's cultural identity and native language in subsequent generations (Alba & Islam, 2009; De Klerk, 2001; Kim et al., 2017).

Despite a reduction in structural barriers to intergroup interactions and an increased acceptance of intermarriage in multicultural western countries, ethnic and cultural homogamy– the tendency to marry ethnically and culturally similar partners – remains the norm (Bereczkei et al., 2002; Kalmijn, 1994; Schwartz, 2013). Preferences for ethnic and cultural similarity have been extensively documented in studies of mate choice for both short-term and long-term partners (Blackwell & Lichter, 2004; Fisman et al., 2008; Fu, 2001; Hitsch et al., 2010). Similarities in language, values, worldviews and taste enhance both mutual understanding between the spouses, as well as opportunities to participate in and enjoy joint activities (Blackwell & Lichter, 2004; Kalmijn, 1998).

Given the pervasive influence of cultural homogamy combined with the potential harms associated with intermarriage, what motivates people to consider intermarriage in multicultural societies?

Why marry-out?

The main theory put forward by sociologists to explain what motivates individuals to marry-out in spite of the risks incurred argues that intermarriage represents a form of "status-exchange" in which individuals who have a lower status than their partner in one respect, tend to have a higher status than their partner in another (Kalmijn, 1998; Schwartz et al., 2016; Xie & Dong, 2021). Accordingly, individuals competing in the marriage market may compensate for the lack of a desired trait (e.g., physical

appearance, good health) or resource (e.g., education, wealth) by offering other desirable traits or resources to potential marriage partners. While the nature of these dynamics varies with the role each gender plays in society, female youth and associated fertility tend to be highly valued for women, while status and material resources tend to be highly valued for men (Buss et al., 1990), often leading to gendered exchanges where the woman's youth and reproductive potential is "exchanged" for the man's greater wealth or societal status (Coontz et al., 2005; Dribe & Lundh, 2010). The exchange theory of intermarriage has primarily been used to explain drivers of black-white marriages in the United States, in which the white partner leverages his or her privileged racial status to attract a minority partner with higher education, income or youth (Gullickson, 2006; Hou & Myles, 2013; Kalmijn, 1993; Sassler & Joyner, 2011; Schwartz et al., 2016). Other examples include inter-caste marriages in India in which highly educated women from lower castes improve their caste by marrying into more privileged families (Lin et al., 2020), marriage of immigrant women from Eastern Europe to poorly educated Italian men (Azzolini & Guetto, 2017), as well as marriage of ethnic Turks to highly educated or younger ethnic Kurds in Turkey (Gündüz-Hoşgör & Smits, 2002). Though these and many other examples suggest some strategic leveraging of advantage in mating markets, empirical tests of the exchange theory of intermarriage have been criticized on both methodological and theoretical grounds. Methodological critiques are primarily concerned with miss-specification of statistical models (Rosenfeld, 2005, 2010), while theoretical critiques argue exchange theory relies on an inaccurate assumption that both partners shall perceive one group as

superior to the other(s) when engaging in status exchanges (McClintock, 2014; Zafirovski, 2005). The latter contradicts research showing interethnic and interfaith dating and marriage are more common and more tolerated among culturally and politically progressive individuals (Eastwick et al., 2009; Fitzpatrick et al., 2009; Herman & Campbell, 2012). Furthermore, the extent to which status exchanges can be observed may be contextual (Kalmijn, 2010b). For example, the evidence of education-status exchange in black-white marriages in the United States may not be generalizable to other ethnic groups (Jacobs & Labov, 2002; Kalmijn & Van Tubergen, 2010; Qian, 1997), or to black-white marriages in the Netherlands where religious affiliation and language are stronger markers of identity than skin color (Kalmijn & van Tubergen, 2006).

Alternatively, intermarriage may be a mere by-product of homogamy – in particular similarity in socioeconomic status, occupation, or educational attainment between individuals of different cultural backgrounds (Blackwell & Lichter, 2004; Fu, 2001; Kalmijn, 1998). Accordingly, high intermarriage rates may be a lagging indicator of greater intergroup contact, improved intergroup relations and reduced socioeconomic inequalities between groups (Jian, 2017; Khoo, 1994; Rodriguez Garcia, 2015; Rosenfeld, 2008). Still, in many contexts, rates of intermarriage remain much lower than expected if ethnicity, race or religion were irrelevant to mate choice (Kalmijn, 2010b; Livingstone & Brown, 2017; McClendon, 2016) . And although socioeconomic and educational homogamy may offset the greater risk of marital conflict encountered by intermarried couples (Zhang & Van Hook, 2009),

they may nevertheless reflect heightened competition for economic resources on the marriage market that incentivizes marrying out.

Since its beginnings in the early to mid-20th century, academic interest in intermarriage has primarily been motivated by the question of whether minorities would assimilate to the predominant group or integrate with one another, in countries with a history of slavery and/or labor migration such as the United States (Gordon, 1964; Kalmijn, 1998; Khoo, 1994), Brazil (Telles, 2009, 2014), and Western European countries (Coleman, 1994; Meng & Meurs, 2009; Ylänkö, 2000). Consequently, most research on intermarriage has been conducted by sociologists in globalized upper middle- and high-income countries and focused on groups with radically different societal standing from a historical standpoint (Kalmijn, 1998). Yet the potential for intermarriage is a universal phenomenon preceding the intensification of global migratory movements.

Intermarriage is a primary driver of gene flow and cultural exchange, at least since the late Pleistocene (Johnson et al., 2014; Mills, 2018; Pakendorf et al., 2003). Despite ethnographic records rich with example of cross-cultural contact via intermarriage (Jones, 2016; Terashima, 1987), little empirical research on the topic has been conducted in small-scale societies where group relations may be characterized by different dynamics. Large bodies of research in evolutionary anthropology and psychology have been devoted to describing and explaining preferences for certain traits in prospective mates in small-scale societies from physical appearance to wealth, to work effort/productivity to kindness and intelligence (Buss et al., 1990, 2001; Gurven et al., 2009; Little et al., 2007;

Marlowe, 2004; Marlowe & Wetsman, 2001; Pillsworth, 2008). But cultural or ethnic group identification remains by in large absent from that literature. Given their traditional focus on culturally homogenous groups, anthropologists have mainly dealt with a specific case of intermarriage: community exogamy, i.e., marriage between ethnically and linguistically similar individuals who belong to different communities, villages or clans (Durkheim, 1965; Lévi-Strauss, 1949). Community exogamy and cultural intermarriage share many demographic and social correlates including mate scarcity due to small group size and imbalanced sex ratios (Davin, 2007; Dow et al., 2016; Namari, 2013), as well as the need to forge political (Chagnon, 1968; Macfarlan et al., 2018; Sutter Fichtner, 1976) or economic (Chin, 2010; Deardorff, 2017; Lee, 1984; Rosenzweig, 1989; Shenk et al., 2016) alliances between groups. However, endogamous norms of marriage are relatively uncommon in the ethnographic record characterizing only 7.5 % of the populations represented in the Human Relations Area Files (Ember, 2021). In comparison, strong social norms and even laws against interethnic or interfaith unions are pervasive historically and cross-culturally in the contemporary populations where intermarriage is generally studied (Barnett, 1964; Cohen, 1983; Furlong, 1994; Sohoni, 2007). This suggest our parochial tendencies – favoring in-group members at the expense of competing out-groups – may be exacerbated when groups are easily distinguishable from each other on the basis of physical appearance, language and cultural identity markers such as ethnic identification and religious beliefs (McElreath et al., 2003; Smaldino, 2019). Thus, the preference for cultural homophily when choosing marriage partners as well the aforementioned costs of

intermarriage for the individuals involved likely increase with the saliency of group membership and decrease with individual distinctiveness (Ferguson et al., 2001; Hamilton & Gifford, 1976); that is if people in the out-group are seen as more homogeneous, similar between themselves and less distinctive than in-group members (Hamilton & Gifford, 1976).

Goals of study

The study community provides a unique context for investigating the circumstances under which individuals may be motivated to marry outside of their ethnic group. Intermarriage is widespread (50.3% of married couples), there are no strong norms or laws against miscegenation, and villagers of different ethnicities share Spanish and Roman Catholicism as a common language and religion. However, despite these cultural commonalities, the relatively equal societal status of the different groups, as well as frequent and peaceful interactions between their members, ethnicity remains an essential part of individuals' identity and continues to be associated with distinct physical features, social norms and values. Therefore, despite minimal structural barriers to intermarriage, there might still be important costs to marrying outside one's ethnic group. Furthermore, while ethnicity carries little weight in everyday village life, it remains an important factor when competing for government resources, requesting arable land in communal territory, engaging in trade or business ventures outside the community, or in political contexts. Thus, group differences in resource access and use may result in strategic leveraging of advantage that leads to status-exchanges between marriage partners of different ethnicities.

In this chapter, we examine whether resource access strategically motivates individuals to marry in or out of their ethnic group, or whether intermarriage is instead driven by preferences for other individual characteristics in marriage partners that may be more salient than ethnicity. We hypothesize ethnicity is an important factor when choosing marriage partners despite minimal structural barriers to intermarriage. We predict individuals have greater odds of marrying within the same ethnic group than would be expected by chance, even after adjusting for age and educational homophily **(P1)**. Secondly, we evaluate whether there are costs associated with intermarriage. We predict ethnically mixed unions are more likely to end in divorce than marriages between co-ethnics **(P2)**. We then investigate whether intermarriage is driven by status-exchange and predict marrying ethnic Moseten is associated with agricultural rights over a greater area of land in communal Moseten territory for Highlanders and Lowlanders **(P3)**, and/or provide their men with access to younger wives relative to co-ethnics who are not intermarried or married to other non-Moseten **(P4)**. In exchange, we predict Moseten married to Highlanders and Lowlanders should be wealthier **(P5)** and report greater improvements in their standards of living since their marriage relative to siblings who married co-ethnics **(P6)**.

2.2. METHODS

Data analyzed in this chapter are presented in the general introduction section (pages 27-33). Data analyses were conducted in R version 4.1.2. To evaluate

whether individuals are more likely to marry within their ethnic group **(P1)**, we rely on a latent network approach (Redhead et al., 2021), where marriages are treated as undirected edges between spouses and examine the odds of marriage tie formation using a Stochastic Block Model (Redhead et al., 2021) that recognizes the different ethnic groups as separate communities within the village. That model is then paired to a Social Relation Model (Redhead et al., 2021) to include the villagers' ethnicity and adjust for age and sex as individual-level covariates, as well as dyadic covariates including age and years of schooling difference between spouses. The latter allows us to adjust for potential age and educational homophily. Our modeling framework relies on Markov Chain Monte Carlo (MCMC) methods. We run the model for 4000 iterations to allow 4 chains to converge to their stationary distributions. In the results section, we report the means, standard deviations and 2.5^{th} and 97.5^{th} quantiles (95% credibility intervals) which are analogous to the parameter estimates, standard errors and lower and upper bounds of the 95% confidence intervals obtained in a frequentist analysis.

We examine whether interethnic marriages between Moseten, Highlanders and Lowlanders are more likely to end in divorce **(P2)** using survival analysis. We estimate Kaplan-Meier functions with the duration of the relationship, i.e., time (in years) from marriage to divorce, and fit Cox proportional-hazards models to include the age difference between (ex) husbands and (ex) wives' and years of schooling.

Whether intermarriage is associated with agricultural rights over a greater area of land in TCO Moseten for non-Moseten **(P3)** and access to younger wives for

non-Moseten men **(P4)** are assessed using linear models adjusting for relevant covariates.

The wealth **(P5)** and perceived social mobility differences **(P6)** between intermarried Moseten women and their siblings who married co-ethnics are examined using linear mixed models with clustered family IDs to adjust for sibling effects other than intermarriage status. Siblings residing in the community were identified using shared parental IDs.

2.3. RESULTS

Are individuals more likely to marry within their ethnic group than expected by chance? (P1)? Yes, with the exception of Lowlanders.

Ethnicity has a significant impact on the formation of marriage ties for Moseten and Highlanders, but not Lowlanders. Compared to what we would expect by chance, Moseten and Highlanders have respectively 39% (95%CI [1.05–1.86]) and 79% (95%CI [1.15–2.83]) greater odds of marrying co-ethnics (figure 1). Lowlanders, however, are neither nor more or less likely to marry other Lowlanders (mean OR=0.78; 95%CI [0.35–1.77]) (figure 1). Marriage ties are more likely to form between individuals of similar age (age difference mean OR=0.01; CI [0.00–0.02]) and educational attainment (education difference mean OR=0.80; CI [0.73–0.87]) (figure 1).

Are interethnic marriages more likely to end in divorce than marriages between co-ethnics (P2)? Yes.

Relative to marriages between co-ethnics, mixed marriages are 77% more likely to end in divorce at any given time (p=0.01) (figure 2). After 5 years, 37% of mixed marriages ended in divorce compared to 26% of marriages between co-ethnics. After 10 years, 65% of mixed marriages ended in divorce compared to 39% of unions between co-ethnics. There are no significant differences in divorce rates between Moseten married to Highlanders, Moseten married to Lowlanders and Highlanders married to Lowlanders (Appendix A, figure 1). Adjusting for age difference between the spouses (husband's minus wife's age) does not affect the risk of divorce (table 1) but including differences in years of education as a covariate reduces the relative risk of divorce for intermarried couples to 62% (p=0.11) at any given time (table 1). Participants who left a mixed union have a 58% probability of invoking communication issues with their ex-partner as a reason for the separation compared to a 27% probability for divorced participants who were previously married to a co-ethnic; and a 42% probability of invoking conflicts with or rejection by in-laws compared to a 20% probability for participants previously married to a co-ethnic (figure 3).

Do Highlanders and Lowlanders who married with Moseten enjoy agricultural rights over a greater area of land in TCO Moseten (P3)? Yes.

Intermarriage with Moseten is associated with agricultural access to a relatively greater area of land in Moseten communal territory. On average, Highlanders and

Lowlanders who intermarried with Moseten have agricultural access over 2.6 additional hectares of land (p=0.05) in TCO Moseten relative to Highlanders and Lowlanders married to other co-ethnics or to other non-Moseten, adjusting for age, sex, time residing in the community, and household wealth (figure 4). Household wealth is also strongly associated with access to a greater area of land in TCO Moseten (Appendix A, table 1).

Do Highlander and Lowlander men who married Moseten women have younger wives (P4)? No.

Marrying a Moseten woman isn't associated with having a younger wife relative to marrying a co-ethnic or another non-Moseten woman for Highlander and Lowlander men (figure 5). A weak relationship may nonetheless hold for some older men as suggested by a positive interaction term between intermarriage to a Moseten woman and her husband's age (B=0.18; p=0.09) (Appendix A, table 2). Less educated men are also more likely to marry younger women irrespective of intermarriage (Appendix A, table 2).

Are intermarried Moseten women wealthier than their siblings who married co-ethnics (P5)? Yes, but only if they married Highlanders.

Having a Highlander husband (relative to a Moseten husband) is associated with a 32% (p=0.04) increase in the log wealth difference between Moseten women and their siblings who married co-ethnics, adjusting for siblings' sex and age difference with the woman (figure 6). For Moseten women who married Lowlander men, this association is positive but not significant (figure 6).

Do intermarried Moseten women report greater perceived social mobility after their marriage than their siblings who married co-ethnics (P6)? Yes, but only if they married Lowlanders.

Being married to Lowlander (relative to Moseten) is associated with a 0.63 SD (*p*= 0.01) increase in the difference in perceived mobility score for Moseten women relative to their siblings who married co-ethnics, adjusting for siblings' sex as well as age and years of schooling difference between the woman and her siblings (figure 7). For Moseten women who married Highlander men, this association is negative but not significant (B=-0.08; p=0.72) (figure 7).

2.4. DISCUSSION

Intermarriage is the most intimate example of intergroup relations in humans, a hallmark feature of human sociality (Seabright, 2011). Despite its importance for the diffusion of genes and ideas, little is understood about what motivates individuals to marry outside their cultural (ethnic, linguistic, religious) group. Here, we examined whether ethnicity affects the choice of marriage partners **(P1)** and the stability of marriage **(P2)**; and whether strategic leveraging of advantage (i.e., privileged access to land, mate value and wealth) **(P3-P6)** may drive intermarriage between Moseten, Highlanders and Lowlanders in a rural Bolivian community.

We found ethnicity can influence the choice of marriage partners even in a context where structural barriers to intermarriage are minimized suggesting ethnicity

remains a salient identity marker and an important consideration when seeking prospective marriage partners in the Alto Beni context **(P1)**. In the study community, marriage among co-ethnics is more common than would be expected at random for members of the majority group (i.e., Moseten) and the largest ethnic minority (i.e., Highlanders), even after adjusting for age and educational homophily. Highlanders in particular are far more likely to marry co-ethnics despite their minority status within the community (79% greater odds than would be expected by chance). The tendency for Highlanders to marry co-ethnics is likely due to individual preferences for cultural similarity, potential biases from or against members of other ethnic groups, and the presence of various neighboring *intercultural* communities, with a majority Aymara and/or Quechua populations, where culturally similar partners can be sought. Though Moseten have multiple opportunities for interacting with members of other ethnic groups within and outside the village, and a tradition of assimilating immigrants via intermarriage, they are also more likely to marry co-ethnics (39% greater odds than would be expected by chance). Lowlanders, on the other hand, are not more or less likely to marry other Lowlanders, a potential consequence of the ethnic heterogeneity of this group. The Lowlander category is itself composed of multiple culturally close but distinct ethnic groups of very small group size whose members are often already intermarried to other Lowlanders (see figure 1 in introduction). Small group size may also contribute to their greater assimilation to Moseten culture and integration in the community. Most mixed marriages for Lowlanders involve a Moseten spouse (75%) reflecting a less rigid boundary between these two groups. Furthermore, sex ratios for Lowlanders are

biased in the favor of men (see table 1 in introduction), which may also lead to intermarriage. Findings for Moseten and Highlanders suggest the preference for co-ethnics are likely the result of preferences for cultural similarity and/or a calculation of other perceived costs and benefits of intermarriage(?), as opposed to only being a by-product of age and educational homophily (**P1**). Consistently, data collected in 2018 as part of a pilot study for this project suggests negative ethnic stereotypes subsist in the community, especially among Highlanders and Moseten (table X SM). Parents of Highlander women in particular, may view intermarriage to Moseten men as potentially detrimental to the economic well-being of their daughters. For instance, one Aymara father of two teenage girls, himself married to a Moseten woman, told SA he would prefer both his daughters to marry Highlanders because: "although Moseten are very good people, they don't know how to get ahead in life […]. They may drag my daughters down". Moseten's strong sense of ethnic identity and involvement in conflicts with neighboring *intercultural* communities may also contribute to common negative stereotypes about ethnic minorities in the study community. When inquired about opinions or impressions about Highlanders, ethnic Moseten commonly reported perceiving them as "closed-off", "stingy" or making "little effort to adopt Moseten culture and customs" (table X SM). As Highlander men are more likely to migrate and settle in the study community than Highlander women, Moseten men in particular, voiced concerns about the potential negative consequences for their female relatives. For example, an older Moseten men told SA: "They [Highlanders] marry our daughters just to get access to land [in TCO Moseten], and then they don't treat them with respect because they don't really care

about them or love them". Other concerns included fears of heightened competition for mates for Moseten men as reported by a twelve-grader: "Now all the girls [at school] want to go out with *Kollas* (Highlanders) or *Castellanos* (Bolivians of European descent)". Fears about a potential marriage squeeze for Moseten men may not be unjustified. Compared to women and men of all ethnicities, Moseten men are more likely to have never been married (see figure 5 in introduction).

In accordance with our second prediction, we found that all types of mixed marriages (between members of all ethnic groups) were at a greater risk of ending in divorce (**P2**) suggesting intermarriage is costly in the study community. Poor communication and difficulty getting along with in-laws were problems more commonly faced by divorced individuals who were previously involved in mixed marriages than marriages to co-ethnics (figure 3). This result is consistent with studies conducted in industrialized populations, showing that cultural differences in communication styles, values and social norms commonly exacerbate conflicts among spouses of different cultural backgrounds (Bratter & Eschbach, 2006; Renalds, 2011; Smith et al., 2012) . Similarly, lack of support for the marriage from extended family may create or exacerbate interpersonal problems between the spouses (Bratter & Eschbach, 2006; Kim et al., 2017). Similarity in educational attainment – which tends to be correlated with similarity in status, income, values and lifestyles (Kalmijn, 1998) – may however moderate the risk of divorce for intermarried couples in the study community (table X SM). Taken together, results from these two predictions show ethnicity remains an important factor in the choice of marriage partners (especially for Moseten and Highlanders) and the stability of

marriages in AB, and further motivates the need to understand what drives individuals to marry out despite the risks involved**.**

We predicted intermarriage is driven by strategic leveraging of advantage that improves access to socioeconomic resources for all groups (**P3, P5-6**), and/or mate quality for Highlanders and Lowlanders (**P4**). We found evidence for the former but not the latter. Highlander and Lowlander women and men intermarried to Moseten enjoyed agricultural rights over a greater area of land in Moseten communal territory (**P3**), but their men didn't have younger wives relative to co-ethnics married within their ethnic group or to other non-Moseten (**P4**). In exchange, Moseten women (but not men) appear to benefit by marrying wealthier Highlander men (**P5**) and report greater perceived social mobility since marriage than their siblings who married co-ethnics, if they married Lowlander men (**P6**). Consistent with literature on drivers of interracial marriage in North America and Western Europe (Azzolini & Guetto, 2017; Gullickson, 2006; Hou & Myles, 2013; C. Schwartz et al., 2016), and inter-caste marriage in India (Lin et al., 2020), our results suggest exchange of desired resources/traits is an important driver of intermarriage between Moseten women and Highlander men. However, while it is commonly theorized that men are more likely to compete among themselves for female reproductive potential than material wealth or status (Buss et al., 2001; Sassler & Joyner, 2011), here we find evidence that both sexes compete for and exchange socioeconomic resources: access to arable land (and de facto access to civic rights and duties in the study community and OPIM) for men against material wealth for women. Given that women in Moseten communities are entitled to the same land rights and political

representation as men and can pass on those privileges to their spouse and children, marrying Moseten can be enticing for Highlander and Lowlander men in the quest of arable land and other resources provided by representation in local indigenous organizations. However, while Moseten women may leverage their privileged access to land and local political representation to marry wealthier men from other groups, intermarriage may constitute a fallback strategy for Moseten men. Both Moseten men and women tend to view Highlanders in particular as less attractive physically, but though they remain highly desirable prospective marriage partners for women (figure, SM), Moseten men tend to show little interest in Highlander women commonly described as “unattractive”, “too dominant”, or “difficult to live with” (figure, SM), perhaps explaining why intermarriage between Highlander men and Moseten women is much more common than the reverse. It remains unclear whether resource exchanges take place between Moseten women and Lowlander men. While Moseten women married to Lowlander men reported greater perceived social mobility relative to their siblings who married co-ethnics (figure 6, table X SM), they were not found to be wealthier (figure 5, table X SM). Nevertheless, our perceived social mobility measure may capture other aspects of improvement in living conditions such as less strenuous manual labor and access to new job opportunities outside the community. Finally, we have no reason to expect exchange theory to explain intermarriage between the two minority groups: Highlanders and Lowlanders. In the following chapter, we examine alternative drivers of intermarriage that may better apply to these groups.

In conclusion, we showed that ethnic identity can remain an important factor in the choice of marriage partners, despite minimal structural barriers to miscegenation. The idea that intermarriage is costly and that spouses must be somehow compensated for such marriages to actually occur is also consistent with our study results. A major finding in this chapter is that this compensation might come in the form of socioeconomic resource exchanges between spouses of different ethnicities, notably access to land and civic rights for Highlanders and Lowlander men, and access to greater material wealth and possibly better living conditions for Moseten women. We find women's socioeconomic resources, and not reproductive potential, to be their currency for these exchanges, emphasizing the importance of taking into account women's status in society when analyzing these patterns. Though the nature of these exchanges may not be generalizable across contexts, the general framework of the exchange theory of intermarriage may nonetheless be used to generate predictions about patterns of intermarriage in contemporary small-scale societies, where resource access varies between groups; and contribute to debates in archaeology and genetics about the nature of intergroup contacts and patterns of human dispersal.

Figure 1. Log odds ratios of marriage tie formation. Error bars represent standard deviation of the predicted mean log ORs across iterations (N=409).

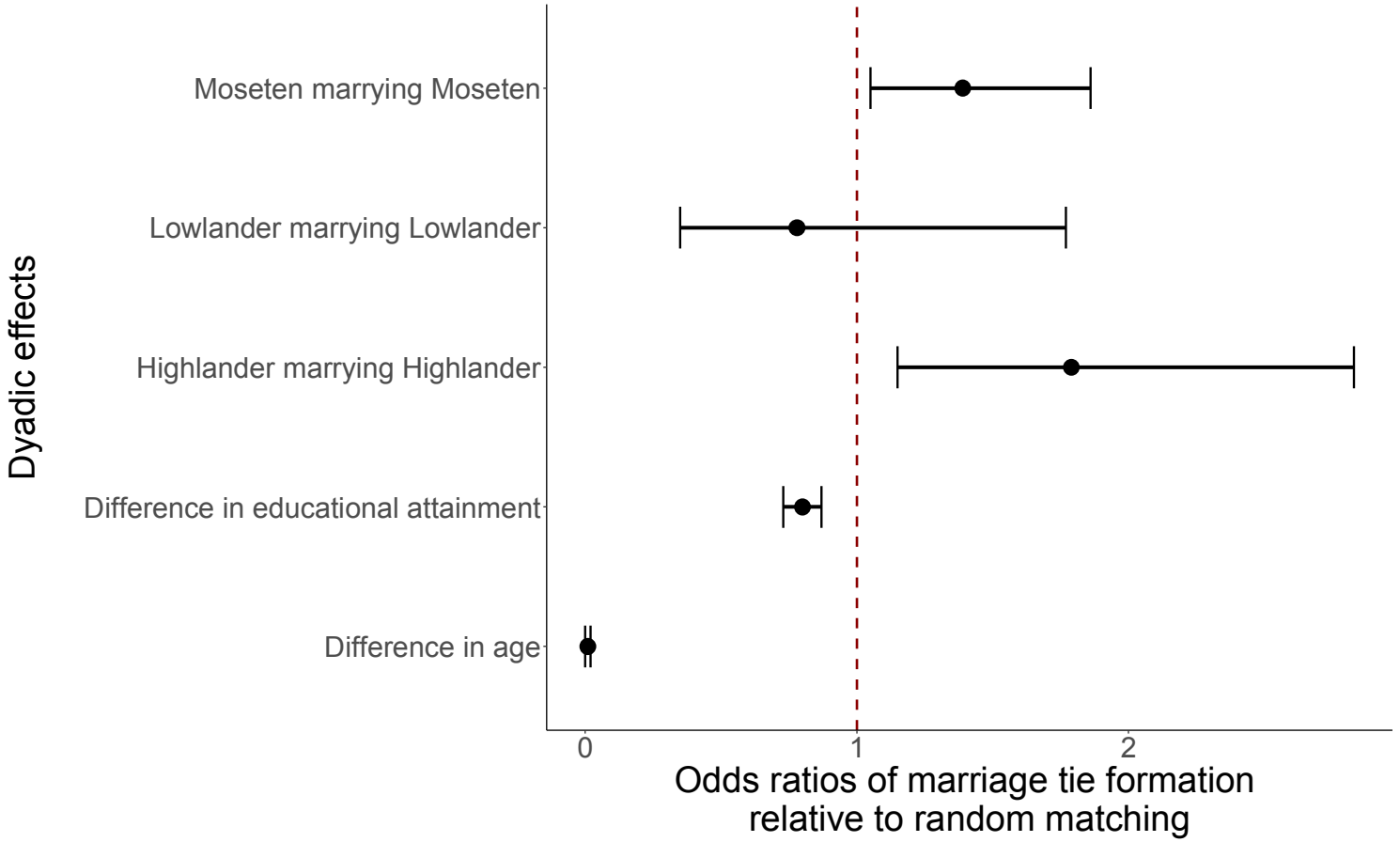

Figure 2. Survival probability of ethnically endogamous (N=92) and ethnically exogamous unions (N=111)

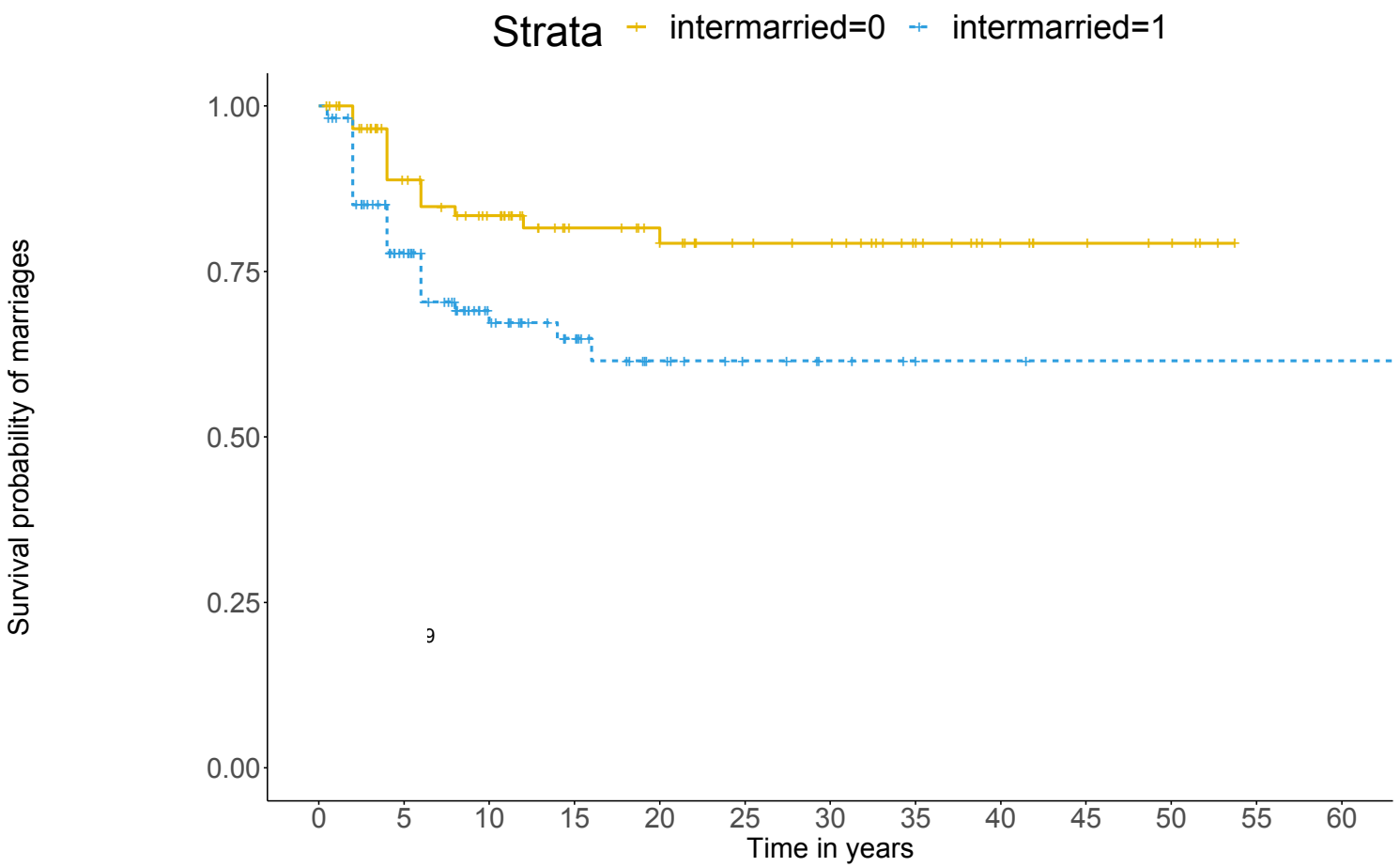

Figure 3. Main causes for marriage dissolution reported by 48 divorced participants

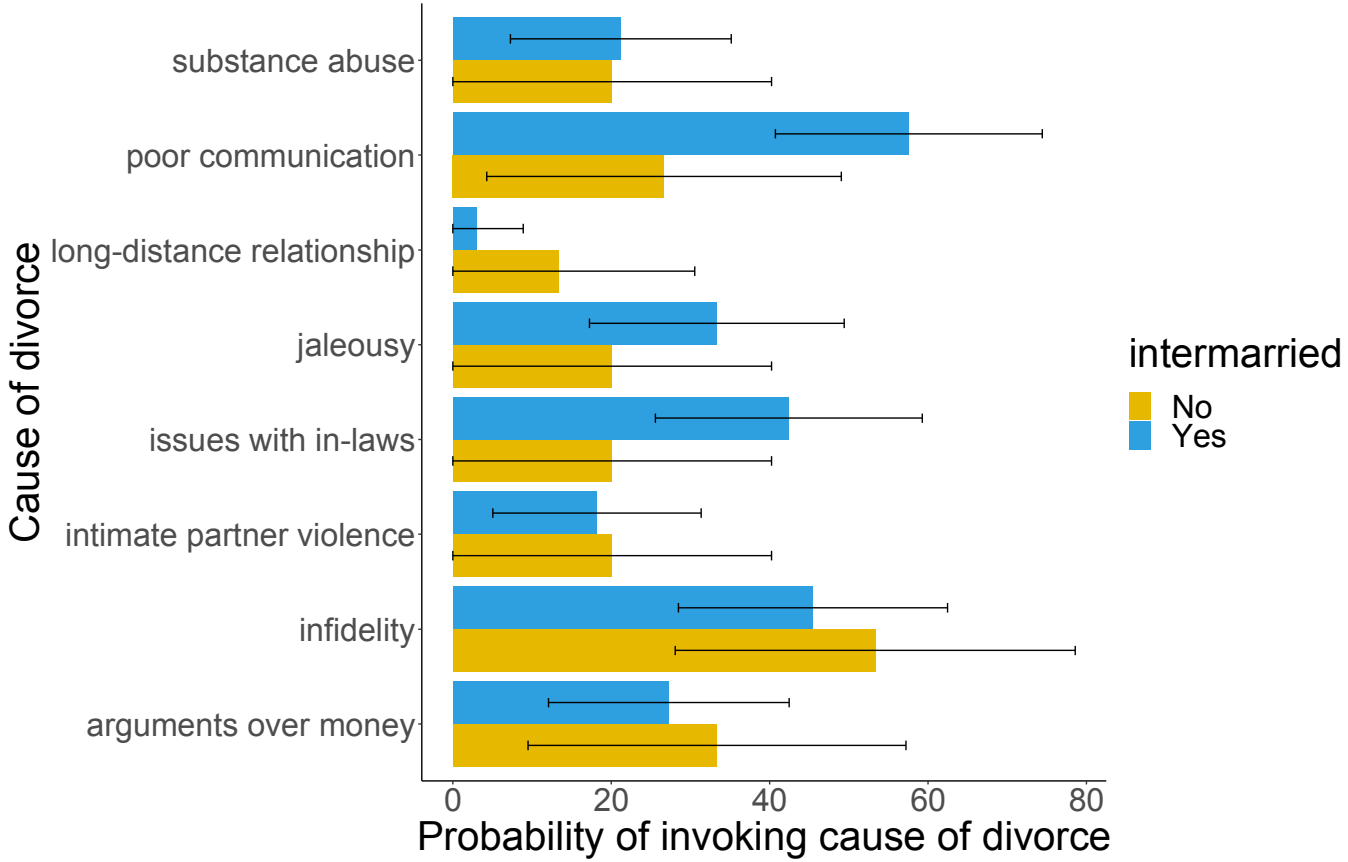

Figure 4. Predicted average number of hectares of land in TCO Moseten allocated to Highlander and Lowlanders married to co-ethnics vs. Moseten (N=107). Estimates from model adjusting for age, sex, time of residence in the community and household wealth. Error bars represent standard errors of the predicted mean value. Points represent partial residuals.

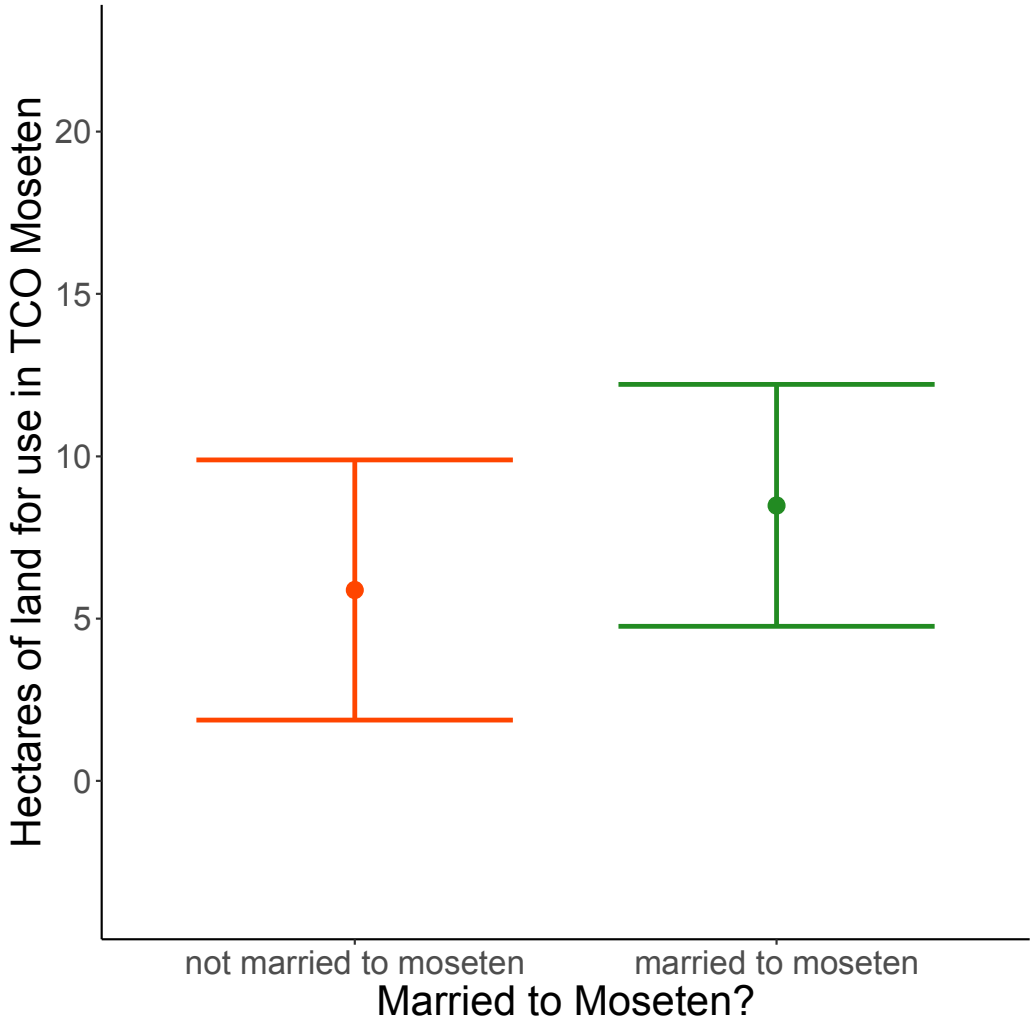

Figure 5. Predicted average age difference between Highlander and Lowlanders men and their wives (N=77). Estimates from model adjusting for age, years of schooling, and ethnicity (Highlander vs. Lowlander). Error bars represent standard errors of the predicted mean value. Points represent partial residuals.

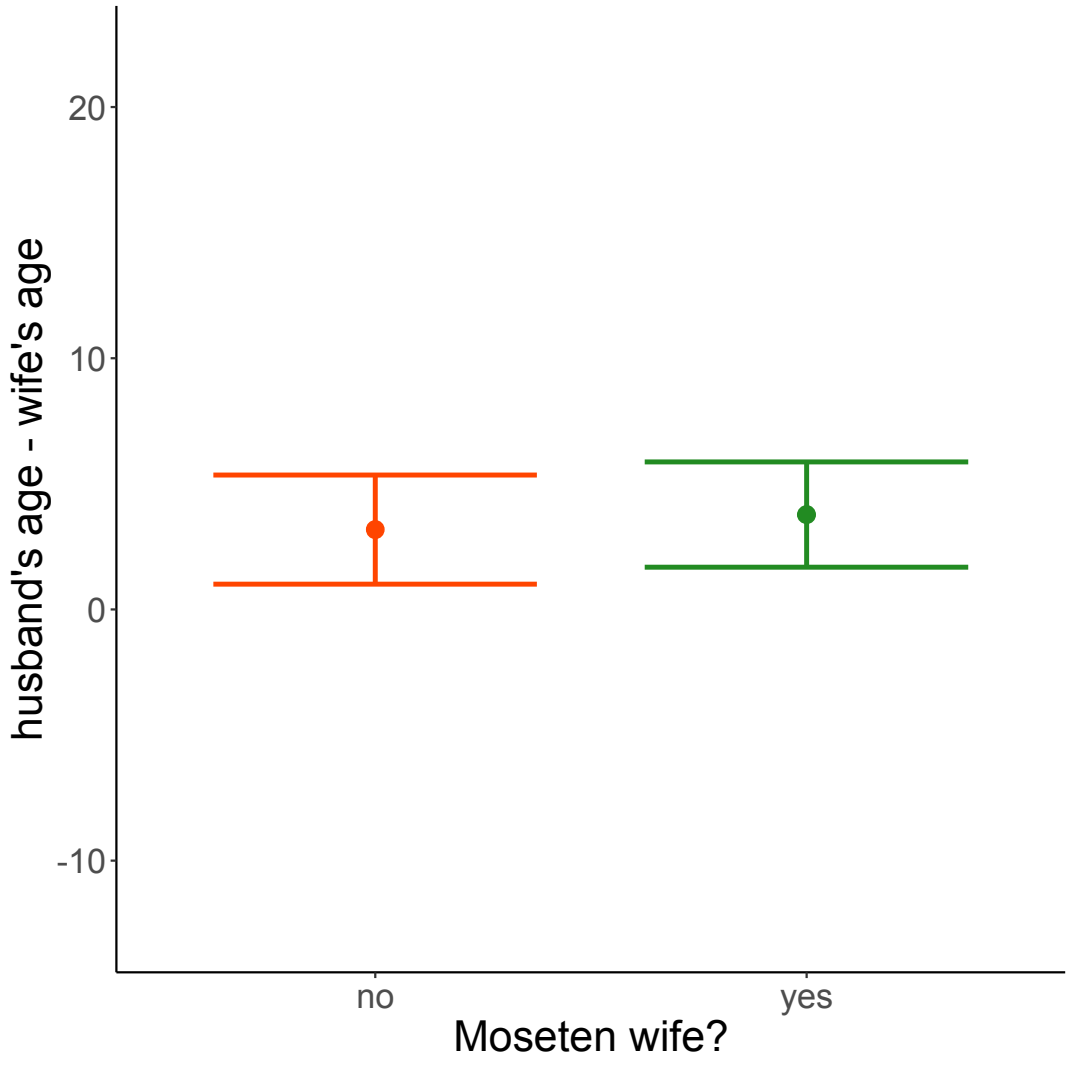

Figure 6. Log difference in wealth between intermarried Moseten women and their ethnically endogamous siblings in the community (N=140). Estimates from model adjusting for parental ID, sibling's sex and age and years of schooling difference between each pair of siblings. Error bars represent standard errors of the predicted mean value. Points represent partial residuals.

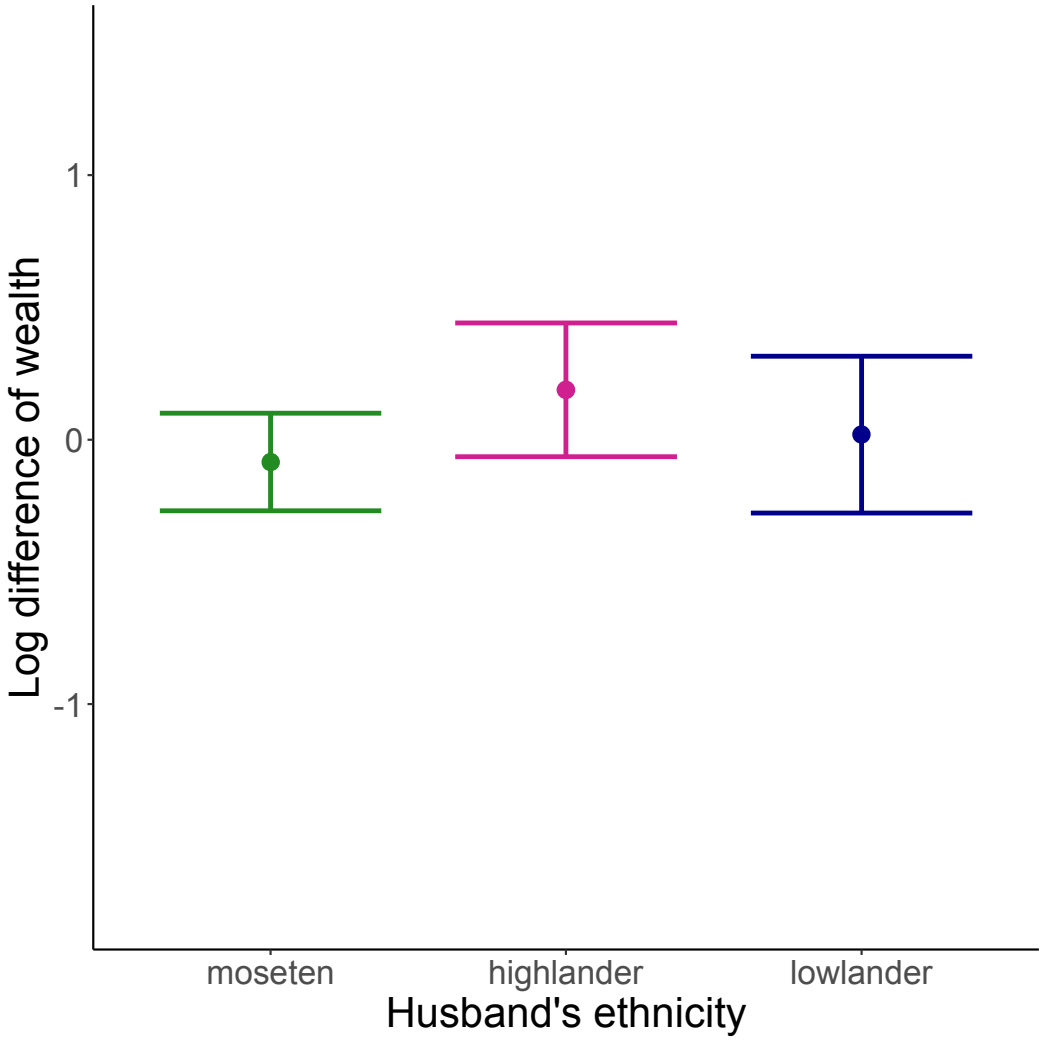

Figure 7. Difference in perceived social mobility score since marriage between intermarried Moseten women and their ethnically endogamous siblings in the community (N=140). Estimates from model adjusting for parental ID, sibling's sex and age and years of schooling difference between each pair of siblings. Error bars represent standard errors of the predicted mean value. Points represent partial residuals.

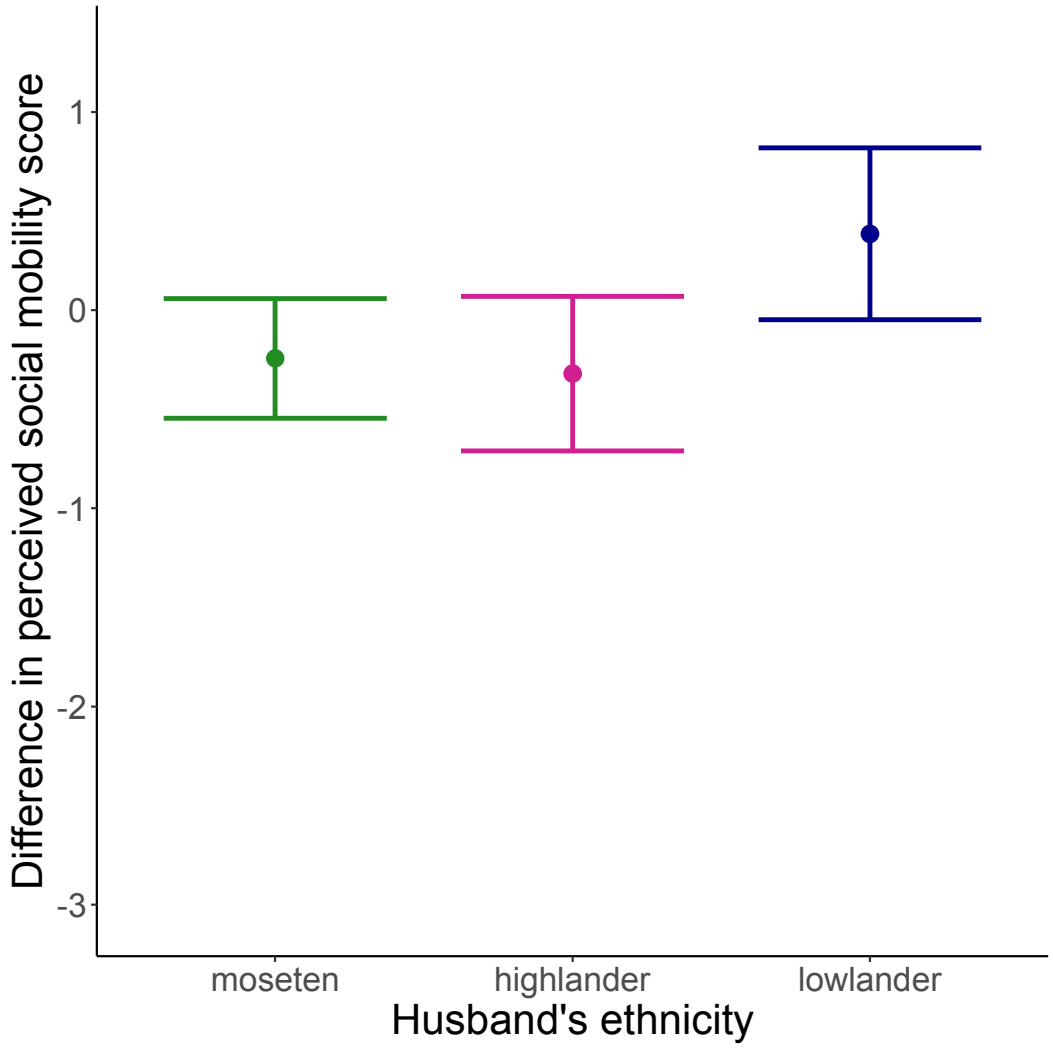

Table 1. Estimates from Cox Proportional Hazard models of the effect of being intermarried on hazard of divorce adjusting for the age difference (models 2,4) and years of education difference (models 3,4) between the spouses.

	Dependent variable: Marriage duration in years			
	exp(B) (SE)			
	Model1	**Model2**	**Model 3**	**Model 4**
Intermarriage	1.76*(0.29)	1.81*(0.29)	1.41 (0.37)	1.40 (0.37)
Spouses' age difference		1.04 (0.03)		
Spouses' years of schooling difference			1.12* (0.07)	1.13*(0.07)
N	203	203	184	184

*p<0.05

2.5. REFERENCES

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3. INTERMARRIAGE IMPROVES ECONOMIC RECOVERY FROM EXOGENOUS AGRICULTURAL SHOCK

ABSTRACT

Anthropologists have long hypothesized that community exogamy can smooth the risk of exogenous shocks to food production. In a multiethnic region of central Bolivia, I leverage a localized crop failure event in 2016-2017 to investigate whether interethnic marriage fulfills a similar risk-management function in contexts where production strategies and social networks vary between groups. Consistent with interethnic marriage buffering resource shortfalls in high-risk settings, I find among a sample of 155 couples that intermarried Moseten-Highlander couples are better able to recover from the economic impacts of crop failure than their ethnically endogamous counterparts. This greater resilience is likely due to more diverse production strategies and reliance on remittances from larger extra-community social support networks. Results suggest norms favoring intermarriage may be more likely to spread in ecologies characterized by high variance in production.

3.1. INTRODUCTION

Intermarriage is a primary driver of gene flow and cultural exchange in our species (Bentley et al., 2009; Johnson et al., 2014; Mills, 2018; Nielsen et al., 2017; Pakendorf et al., 2003). Despite strong interest in the study of marriage systems and intergroup relations, efforts to understand the drivers and consequences of intermarriage between members of different ethnic or religious groups remain scarce in the evolutionary social sciences. To date, research on the topic has primarily been undertaken by sociologists focusing on the nexus between intermarriage and minority integration in industrialized populations with high levels of international immigration and/or a history of slavery (Kalmijn, 1998; Rodriguez Garcia, 2015; Song, 2009). Within this framework, prevalence of intermarriage and norms favoring or discouraging its occurrence are primarily believed to reflect the salience of group boundaries, and the extent to which members of ethnic or religious minorities are well-integrated into mainstream society (Blackwell & Lichter, 2004; Kalmijn, 1991; Rosenfeld, 2005, 2008). However, individual and third-party preferences for prospective marriage partners, and the resulting norms and institutions, are likely sensitive to new opportunities and challenges that arise when culturally distinct groups come into contact with each other. Opportunities may include a larger pool of prospective marriage partners (Davin, 2007; Jian, 2017; Kalmijn, 1998; Sherwood, 2013), the potential for hypergamy in stratified societies (Gray, 1980; Hou & Myles, 2013; Lin et al., 2020), and access to novel resources when subsistence strategies vary between groups (see chapter 1). Challenges

mainly consist of structural barriers to intermarriage (Kalmijn, 1998; Wardle, 1997), difficulties that may arise from cultural differences (Kalmijn et al., 2005; Smith et al., 2012), and the potential for discrimination and social isolation for the individuals involved (Bratter & Eschbach, 2006; De Miguel Luken et al., 2015; Kusel, 2014).

Evolutionary social scientists are well poised to study the socioecological drivers of intermarriage, given their emphasis on individuals' sensitivity to costs and benefits when explaining variation in human behavior (Hames, 2015). However, due to the historical focus of evolutionary anthropology on culturally homogeneous small-scale societies, research has mainly focused on a different form of exogamy, i.e., community exogamy [vs. endogamy] – the practice of marrying outside [vs. inside] one's natal community (Durkheim, 1965; Lévi-Strauss, 1949; Walker & Bailey, 2014). Unlike intermarriage, community exogamy does not cross (formal or informal) institutional barriers (i.e., linguistic, ethnic, and religious boundaries) and has likely existed for much longer in our evolutionary history (Chapais, 2009, 2013; Pisor & Ross, 2021; Singh & Glowacki, 2021; Sterelny, 2016). And whereas cultural homogamy remains the norm in the contemporary populations where intermarriage is generally studied (Barnett, 1964; Cohen, 1983; Furlong, 1994; Sohoni, 2007), community exogamy is widespread and characterizes the majority of populations represented in the ethnographic record (Dow et al., 2016; Ember, 2021). Despite these important differences, community exogamy and intermarriage share many socioecological correlates, suggesting they may fulfill similar functions. These include reducing mate scarcity in numerically small groups and/or groups with imbalanced sex ratios (Dow et al., 2016; Eklund, 2013; Jian, 2017; Kalmijn, 1998;

Sherwood, 2013) and forging or maintaining alliances between groups in the context of intergroup conflict (Chagnon, 1968; Macfarlan et al., 2018; Sutter Fichtner, 1976).

Another function of community exogamy hypothesized in the anthropological literature is to smooth the risk of exogenous shocks to economic production. Norms favoring exogamy can be beneficial in ecologies characterized by unpredictability or variability in economic production (Kelly, 1995; Lee, 1984; Wiessner, 2002). Accordingly, exogamous norms and intercommunity marriage are more common in the ethnographic record under conditions of greater ecological uncertainty (Dow et al., 2016; Kelly, 1995). Exogamous norms lead to societies with “extensive” kinship networks, in which individuals rely on broad and diverse social ties to help buffer risk (Shenk et al., 2016; Walker & Bailey, 2014). Conversely, societies which promote endogamy are more likely to show “intensive” kinship networks, whereby family members maintain strong bonds to avoid the dilution of family wealth or status (Borgerhoff Mulder et al., 2009; Bugos, 1985; Schulz et al., 2019; Shenk et al., 2016). Individuals who marry outside their natal group can broaden their social support networks since their spouse is more likely to know people previously unknown to them. Diversifying one's social support network may protect against shortages from localized natural disasters that affect members of the same network (i.e. aggregate shocks), and provide novel information, resources and opportunities from individuals who are less exposed to the same shocks (Granovetter, 1973). Among Ju/’hoansi foragers, for example, marrying to a family with access to a different waterhole allows them to forage at both waterholes, protecting them

against either one drying up (Lee, 1984). Among South Indian farmers, families similarly use intercommunity marital arrangements strategically to reduce the variance in production associated with weather variability (Rosenzweig, 1989).

Here, I test the hypothesis that intermarriage may fulfill a similar risk-management function in multicultural societies where group identity is linked to different occupations, production strategies, and social networks. In particular, I investigate whether intermarried couples are less susceptible and/or more resilient to an exogenous shock to production due to having a more diversified production portfolio and coping mechanisms, as well as access to broader social support networks. Examining whether intermarriage helps buffer risk in the context of an exogenous shock to production allows for the possibility of making causal inference and avoids confounding and measurement errors common in tests based on observational data alone.

Study goals

Until 2018, cash cropping of papaya was a primary source of income for a majority of households in the study community. In the beginning of 2016, papaya growers in the study community started noticing yellowing and necrosis along leaf edges of their papaya trees, followed by the appearance of dark spots on the skin of the fruits, and water-soaked areas on stems. These symptoms, perhaps indicative of papaya dieback disease (Talukdar et al., 2020), were shortly followed by secondary fungal infections leading to the death of trees, the loss of close to 100% of plants in the following growing seasons, and the abandonment of papaya production for most households by 2018. The economic impact of the papaya disease was so great that

a dozen families (not included in the sample for this study) relocated permanently in a community located a few kilometers northeast or migrated to neighboring towns and major urban centers in search of new work opportunities. Families of papaya growers who remained in the study community were forced to make radical changes to their economic activities or face drastically reduced income.

In this chapter, I leverage this crop failure event to investigate whether prior intermarriage between members of different ethnic groups in the study community helped buffer risk. I first examine the current (i.e., post-crop failure) production strategies of households and predict that intermarried couples should have more diversified sources of income **(P1)**. Secondly, I compare the extent to which intermarried, and endogamous households relied on papaya as a source of income. I predict that intermarried couples should have been less reliant, in terms of percentage of income, on papaya sales than their ethnically endogamous counterparts **(P2)**. I then compare the coping mechanisms of households and predict that intermarried couples had access to more back-up strategies **(P3)**, and relied on broader social support networks to help them cope with the papaya disease **(P4)**. Finally, I predict that household income in 2021 should show greater economic recovery for intermarried couples due to more diversified production, access to more back-up strategies, and/or broader social support networks **(P5)**.

3.2. METHODS

Data

Income diversification. Income diversification was measured for the year 2021 using the Simpson diversity index, expressed as follow:

$$\text{Simpson Diversity Index} = 1\text{-}\sum p_i^2$$

Where p_i = the proportion of income from source "i". Income sources include the following: household agricultural sales for main cash crops, i.e., (1) papaya, (2) cacao, (3) citrus fruits, (4) plantains or bananas, and (5) cassava; (6) husband's and wife's (7) income from wage labor; (8) income from driving a taxi; (9) household profit from store or other small business; and (10) household profit from timber sales.

Reliance on papaya sales. In structured interviews, heads of households were asked to estimate their income from papaya sales in the year preceding the disease (2015). To facilitate recall, they were presented with bins of 500 Bolivianos (~72.5 USD) increments and asked to choose an amount that approximates how much they earned from papaya sales. Participants were then asked about their annual household income in 2015 and were also presented with bins of 500 Bolivianos to facilitate recall. Reliance on papaya sales was estimated by calculating the percentage of total household income represented by papaya sales. Participants were also directly asked what percentage of their total annual income (including their income from both agricultural sales and other activities) did papaya represent in 2015 to verify the above data. Once again, to help with recall, participants were shown bins of 10% increments and asked to choose an amount that approximates the percentage of annual income resulting from papaya sales prior to the disease.

Number of back-up strategies. Heads of households were asked an open-ended question about what they did to compensate for the losses incurred due to the papaya disease. This question was then coded by SA and generated seven categories of back-up strategies including: (1) increasing the production of other crops; (2) starting an agricultural field elsewhere; (3) harvesting and selling timber; (4) turning to wage labor; (5) relying on bank savings; (6) obtaining a loan from a bank; and (7) relying on remittances from family and friends outside the community.

Social support networks. Collection of social network data is described in the general introduction (pages 21-22). For the purpose of this chapter, I consider the total number of unique social ties at the household level nominated in questions eliciting behavioral assistance (i.e., support with manual labor and food sharing), financial assistance (i.e., loans and material support), support in finding work, help with bureaucracy for land access, and family and friends outside the community on whom the husband and/or wife could rely for material assistance.

Economic recovery. To generate a measure of economic recovery I calculate the percentage of income recuperated by households affected by the papaya disease by 2021.

Analyses

Linear regression models are used to examine the relationship between intermarriage and (**P1**) income diversity in 2021, adjusting for spouses' ages and years of schooling; **(P2**) reliance on papaya sales in 2015, adjusting for household income in 2015, spouses' ages and years of schooling; **(P3)** number of back-up strategies used adjusting for reliance on papaya sales in 2015, spouses' ages and

years of schooling; **(P4)** number of social support partners within and outside the community adjusting for household income in 2021, spouses' ages and years of schooling; and **(P5)** income recovery, adjusting for reliance on papaya sales in 2015, household income in 2021 and spouses' ages and years of schooling. Mediation analyses are used to investigate whether intermarried couples are better able to recover from the papaya disease thanks to more diversified production, access to more back-up strategies, and/or broader social support networks **(P5)**.

3.3. RESULTS

Sample size and demographic characteristics of couples

The sample includes 158 couples who all reside in the study community: 31% endogamous Moseten, 26% endogamous Highlanders, 2% endogamous Lowlanders, 20% intermarried Moseten-Highlander couples, and 21% intermarried Moseten-Lowlander couples. Endogamous Lowlander couples were excluded from analysis due to small sample size resulting in a total sample of 155 couples. Intermarried couples tend to be ~ 5 years younger than their ethnically endogamous counterparts (table 1). Endogamous Highlanders, and both Highlanders and Lowlanders married to Moseten have completed on average ~ 3 more years of schooling than endogamous Moseten (table 1). Endogamous Highlander and intermarried Moseten-Highlander couples have higher median household income (30,556 BOB [1 BOB=$0.15] and 34,889 BOB in 2021, respectively) relative to both

endogamous Moseten (24,943 BOB) and intermarried Moseten-Lowlanders (24,111 BOB) (table 1).

Do intermarried couples currently have more diversified production strategies (P1)?

Income composition for intermarried and non-intermarried couples in 2021 is shown in figure 1. Wage labor constitutes a more important source of income for endogamous Moseten and Moseten-Lowlander couples (respectively, ~69% and ~66% of average annual income in 2021) than for endogamous Highlander (~47%) and Moseten-Highlander (~55%) couples, who rely relatively more on agricultural sales (~53% and ~45% respectively) (figure 1). In particular, endogamous Highlander couples and intermarried Moseten-Highlander couples rely more on profit from cacao (~14% and ~17% respectively) relative to endogamous Moseten and Moseten-Lowlander couples (1% and 7% respectively) (figure 1). Profit from small businesses such as local eateries and small shops is exclusive to endogamous Highlander (~6%) and Moseten-Highlander couples (~8%) (figure 1). Profit from driving a taxi is on average greater for intermarried Moseten-Highlanders (~6%) and Moseten-Lowlanders (~6%) than endogamous Highlanders (~4%) and endogamous Moseten couples (1%) (figure 1).

Moseten-Highlander couples have 6.5% (p=0.02) higher Simpson's diversity index for income sources in 2021 (figure 2) relative to Moseten couples, adjusting for age and years of schooling of spouses. However, their sources of income are not significantly more or less diverse than endogamous Highlander couples (figure

2). Moseten-Lowlander couples do not have more or less diverse sources of income relative to Moseten couples (figure 2).

Did intermarried couples rely less on papaya as a source of income (P2)?

Only 55% of Moseten-Highlander couples and 52% of Moseten-Lowlander couples interviewed relied on any papaya sales prior to the onset of diseases in comparison with 74% of endogamous Moseten and 61% of endogamous Highlander couples. In terms of percentage of total household income in the year preceding the onset of the papaya disease, profit from papaya sales represented only ~30% for intermarried Moseten-Highlander couples and ~35% for endogamous Highlander couples relative to ~50% for intermarried Moseten-Lowlander couples and 62% for endogamous Moseten couples (figure 3). By 2021, roughly five years after the papaya disease, profit from papaya sales constituted only a minimal source of income (<1%) for all couples within the study community (figures 1,3).

Among households who cultivated any papaya prior to the onset of disease in 2015 and relative to endogamous Moseten couples, the proportion of total household income represented by papaya sales was ~35% lesser (p<0.001) for intermarried Moseten-Highlanders, and ~22% lesser for endogamous Highlander couples (p<0.001) adjusting for household income in 2015 and the spouses' ages and years of schooling (table 2). Intermarried Moseten-Lowlander couples didn't significantly differ from endogamous Moseten couples with respect to their reliance on papaya sales in 2015 (table 2).

Do intermarried couples have access to more backup strategies (P3)?

Intermarried Moseten-Highlander and Moseten-Lowlander couples affected by the papaya disease do not turn to significantly more coping strategies relative to their endogamous counterparts (table 3). However, the nature of coping strategies varies with the ethnic composition of households (figure 4). Generally speaking, intermarried Moseten-Highlander and endogamous Highlander couples are more likely to report having received remittances from family and friends outside the study community, while Moseten-Lowlander and endogamous Moseten couples are more likely to report turning to wage labor (figure 4).

Do intermarried couples have larger social support networks (P4)?

Intermarried Moseten-Highlander couples, but not Moseten-Lowlander couples, have more social ties within and outside the study community relative to their endogamous counterparts (figures 5-6). Relative to endogamous Moseten couples, intermarried Moseten-Highlander couples nominated on average 1.9 (p=0.05) more helpers within the study community and 7.9 (p<0.001) more helpers outside the study community, adjusting for spouses' age, years of schooling, and household income in 2021 (figures 5-6). Relative to endogamous Highlander couples, intermarried Moseten-Highlander couples nominated on average 2.0 (p=0.03) more helpers within the study community and 4.2 (p<0.01) more helpers outside the study community (figures 5-6).

Are intermarried couples better able to recover their losses, and if so how (P5)?

By 2021, intermarried Moseten-Highlander couples affected by the papaya disease recovered 41% (p=0.04) and 30% (p=0.09) more of their 2015 income relative to endogamous Moseten and endogamous Highlander couples respectively, adjusting for spouses' ages, years of schooling, household income in 2021, and reliance on papaya sales in 2015 (table 4: model 1; figure 3). Moseten-Lowlander couples are not significantly different from endogamous Moseten couples with respect to percentage of income recovered (table 4: model 1; figure 3).

Reliance on remittances from friends and relatives and having more social ties outside the community mediate the relationship between intermarriage and economic recovery from the papaya disease shock for intermarried Moseten-Highlander couples when compared to endogamous Moseten couples, but not endogamous Highlander couples (table 4: models 2-4). We find no other mediation effects for other back-up strategies or for the number of within-community social ties.

3.4. DISCUSSION

A primary function of community exogamy hypothesized in the anthropological literature is to smooth the risk of exogenous shocks to food production. Here, I examined whether intermarriage may play a similar role in a multiethnic village where production strategies vary by ethnicity.

Overall, interethnically married couples tend to show evidence of better resilience in the face of an exogenous shock, in this case a papaya disease that wiped out a major cash crop in 2016-2017. Resilience was most evident among Moseten-Highlander couples rather than other ethnic combinations, like Moseten-Lowlander, suggesting that pre-existing economic profiles that covary with ethnicity likely drive the observed buffering. Intermarried Moseten-Highlander couples had significantly more diversified sources of income in 2021 relative to endogamous Moseten couples, but not endogamous Highlander couples **(P1)**. Relative to endogamous Moseten and similar to endogamous Highlanders, intermarried Moseten-Highlander couples are more likely to rely on income from agricultural sales, taxi driving and profit from small local businesses, suggesting Moseten intermarried to Highlanders adopt their spouses' tendency to cultivate land more intensively or engage in business ventures. However, Moseten-Lowlander couples do not significantly differ from endogamous Moseten in terms of income diversification and adopt similar production strategies, suggesting that similarities in historical subsistence patterns (i.e., river-based subsistence agriculture and foraging) constrain gains in economic diversification through marriage.

Among couples who relied on any papaya production prior to the onset of disease, both Moseten-Highlander couples and endogamous Highlander couples relied less on papaya sales relative to endogamous Moseten couples **(P2)**. Once again, this result does not hold when comparing intermarried Moseten-Highlander couples to endogamous Highlander couples, or intermarried Moseten-Lowlanders to endogamous Moseten.

Although intermarried couples did not have access to more back-up strategies **(P3)**, their coping strategies appeared to rely more on connections outside the local community. For example, intermarried Moseten-Highlander couples relied on receiving remittances from friends and family outside the community the most. They also have more social support ties within and outside the study community relative to both endogamous Moseten and Highlanders **(P4)**.

By 2021, Intermarried Moseten-Highlander couples (but not intermarried Moseten-Lowlander couples) recovered a significantly greater percentage of income lost to disease relative to both endogamous Moseten and Highlanders **(P5)**. Greater recovery relative to endogamous Moseten is mediated by their reliance on remittances from relatives and friends outside the community and number of extra-community ties, suggesting they may have received more financial support overall. However, these mediation effects do not explain their greater recovery relative to endogamous Highlanders.

Taken together, these findings suggest that in a context where production strategies vary between groups, intermarriage may lead to reduced susceptibility and greater resilience to localized shocks to production, thanks to to more diverse production strategies and access to broader social support networks who are less exposed to the same shocks. Although a greater ability to buffer risk may be an unintended consequence of intermarriage, the potentially greater material success of intermarried couples in ecologies characterized by greater environmental unpredictability may result in more favorable attitudes and norms towards intermarriage.

Figure 1. Income composition by spouses' ethnicities in 2021.

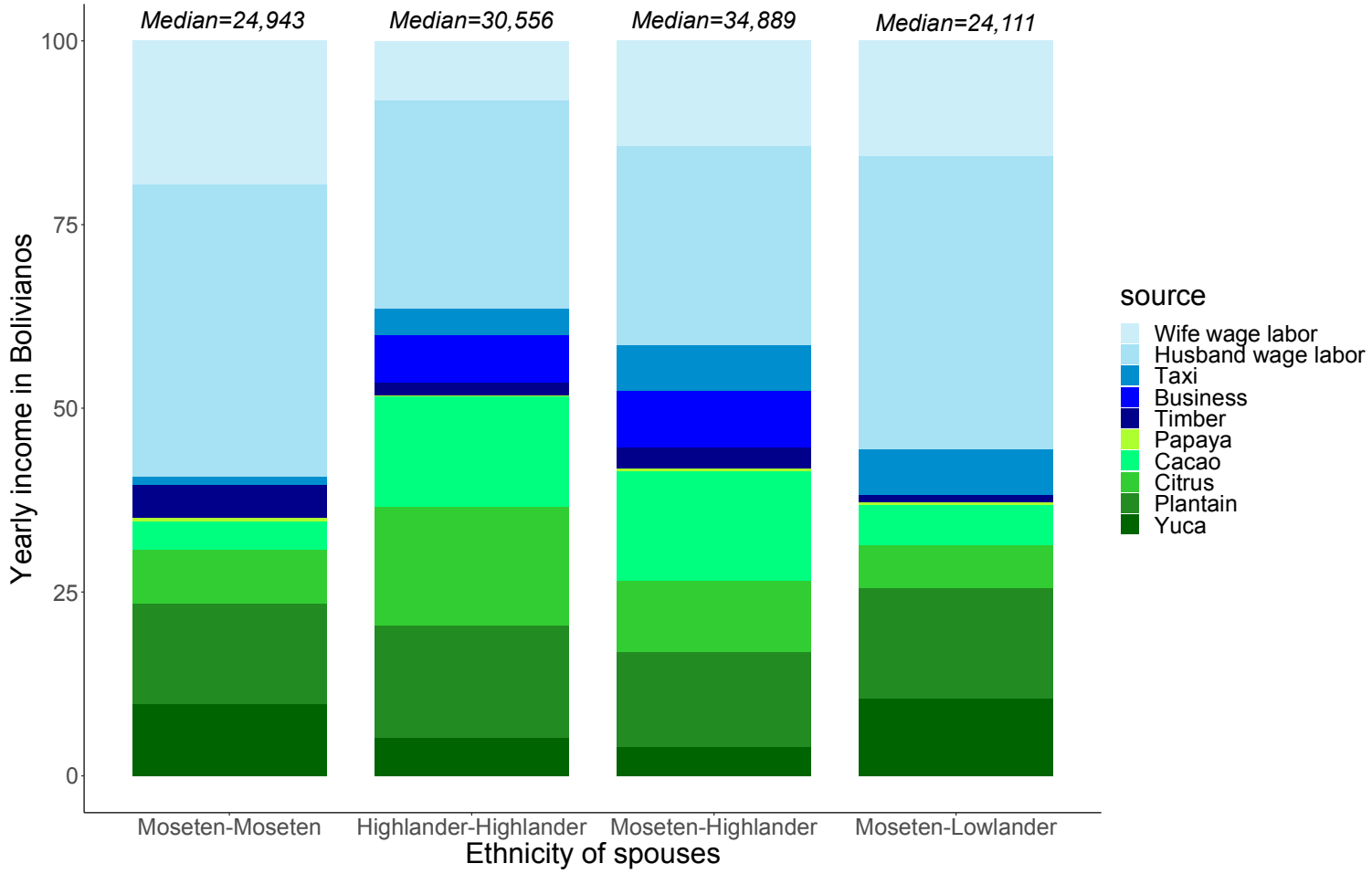

Figure 2. Simpson Diversity Index for intermarried and ethnically endogamous couples. Estimates from linear regression model adjusting for age and years of schooling of spouses.

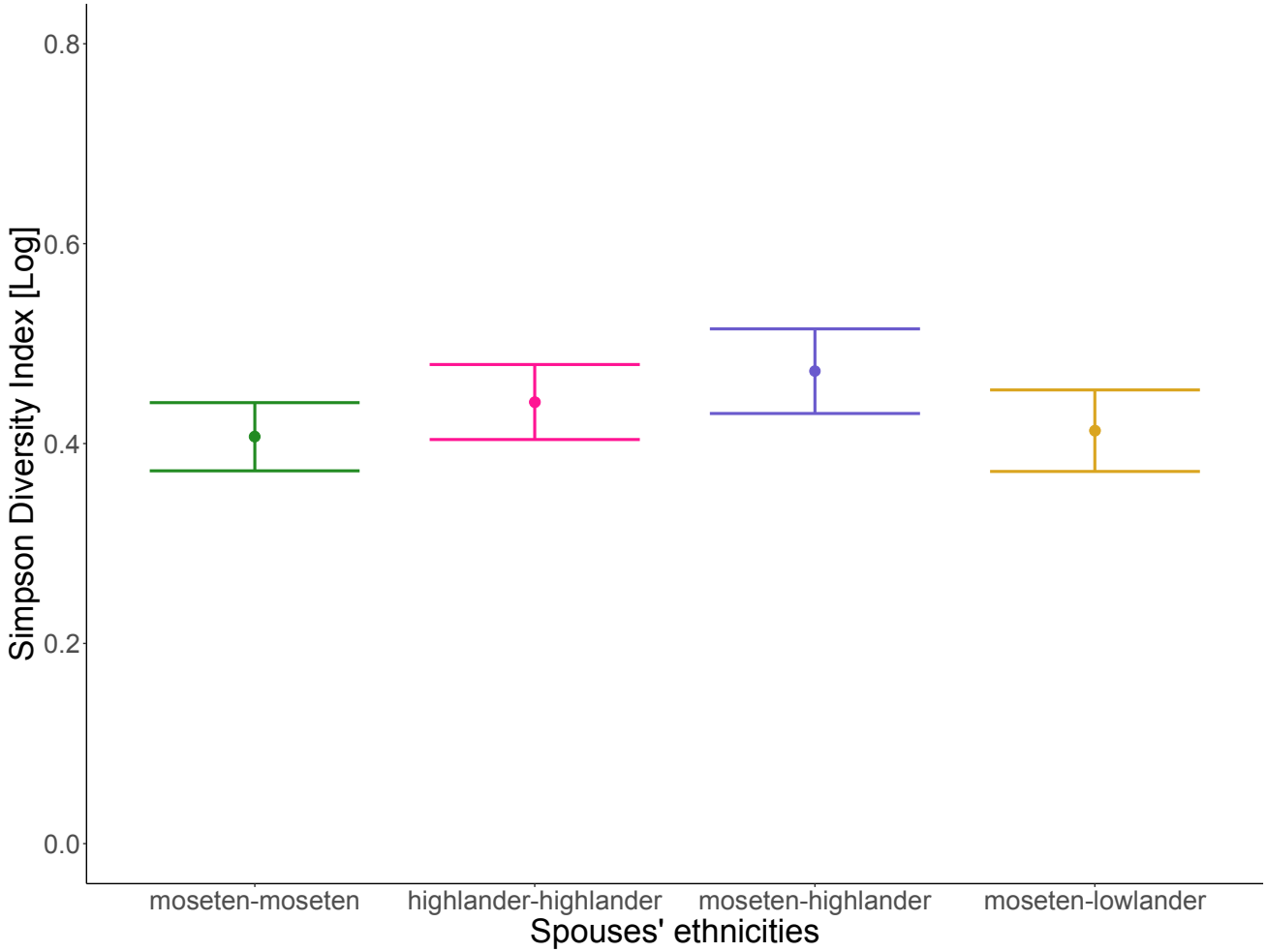

Figure 3. Income from papaya sales and other activities prior to the onset of disease in 2015 and in 2021 (N=96)

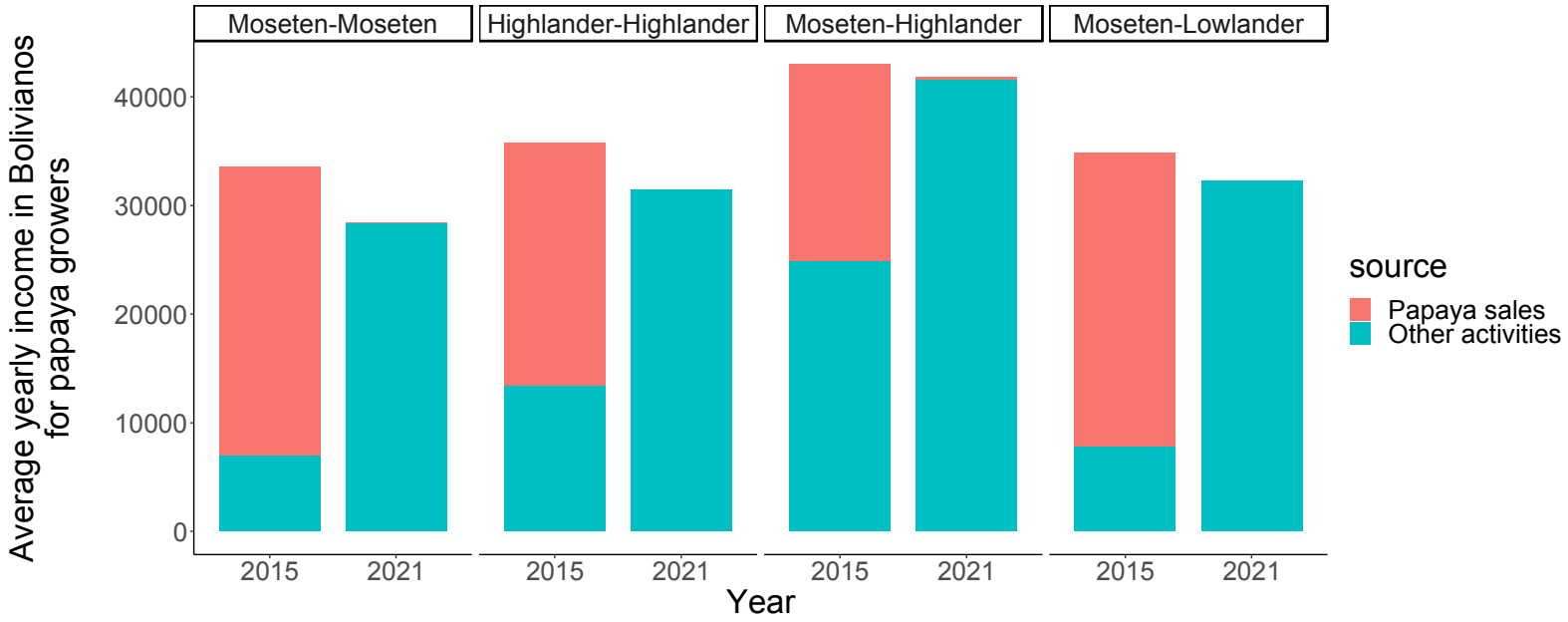

Figure 4. Probability of invoking back-up strategy by ethnicity of spouses

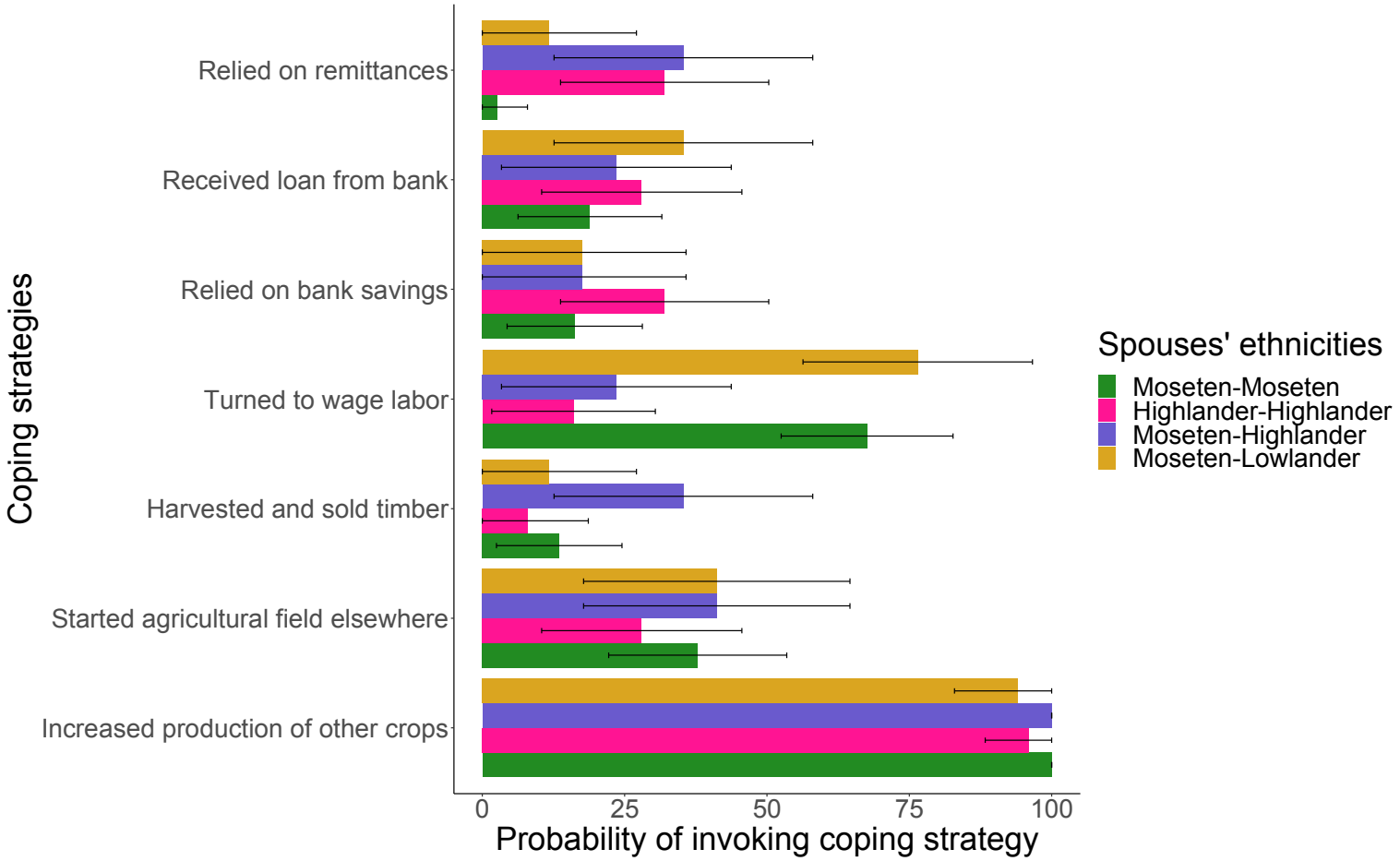

Figure 5. Number of social support ties within the study community by ethnicity of spouses (N=155). Estimates from linear regression model adjusting for age and years of schooling of spouses and household income in 2021.

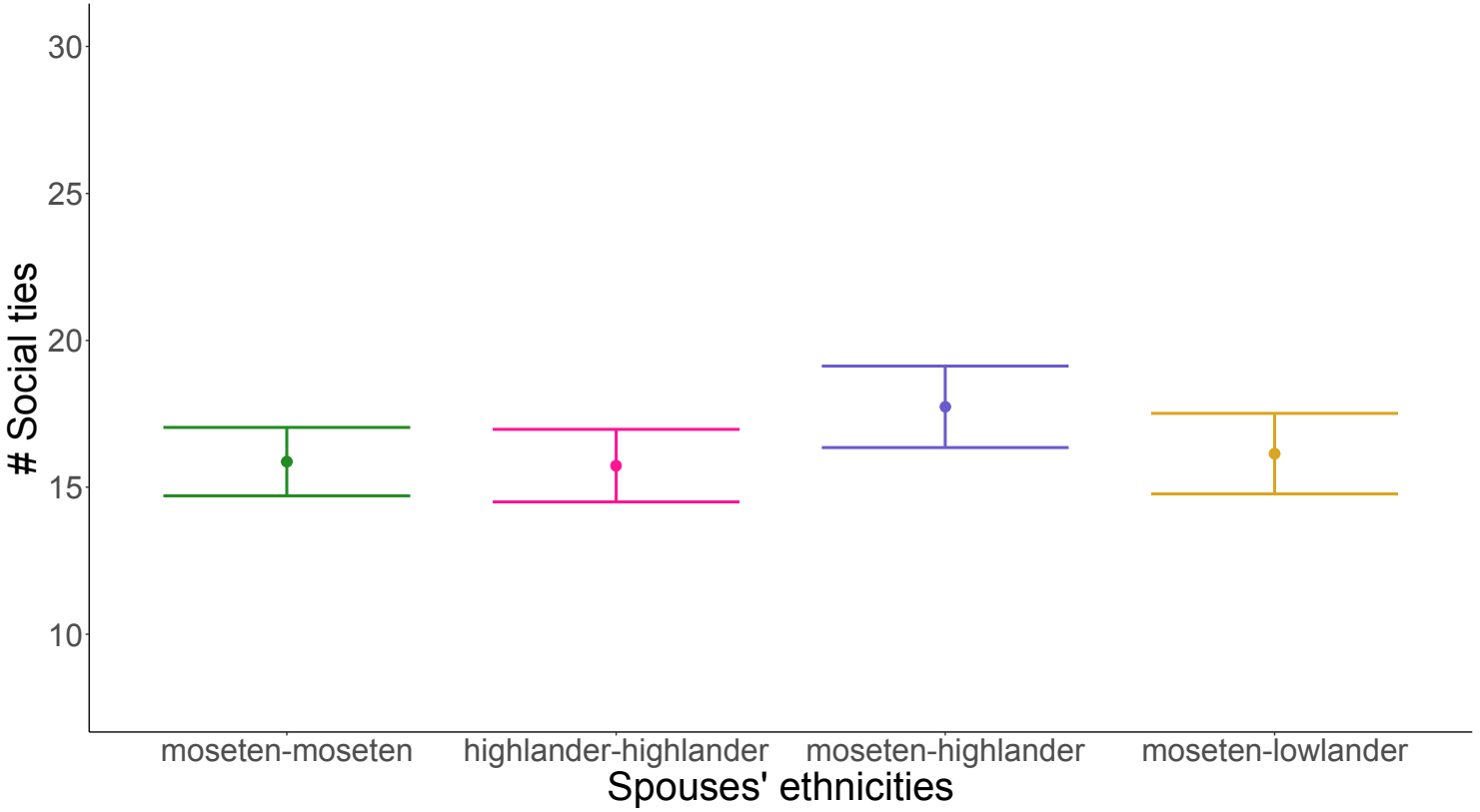

Figure 6. Number of social support ties outside the study community by ethnicity of spouses (N=155). Estimates from linear regression model adjusting for age and years of schooling of spouses and household income in 2021.

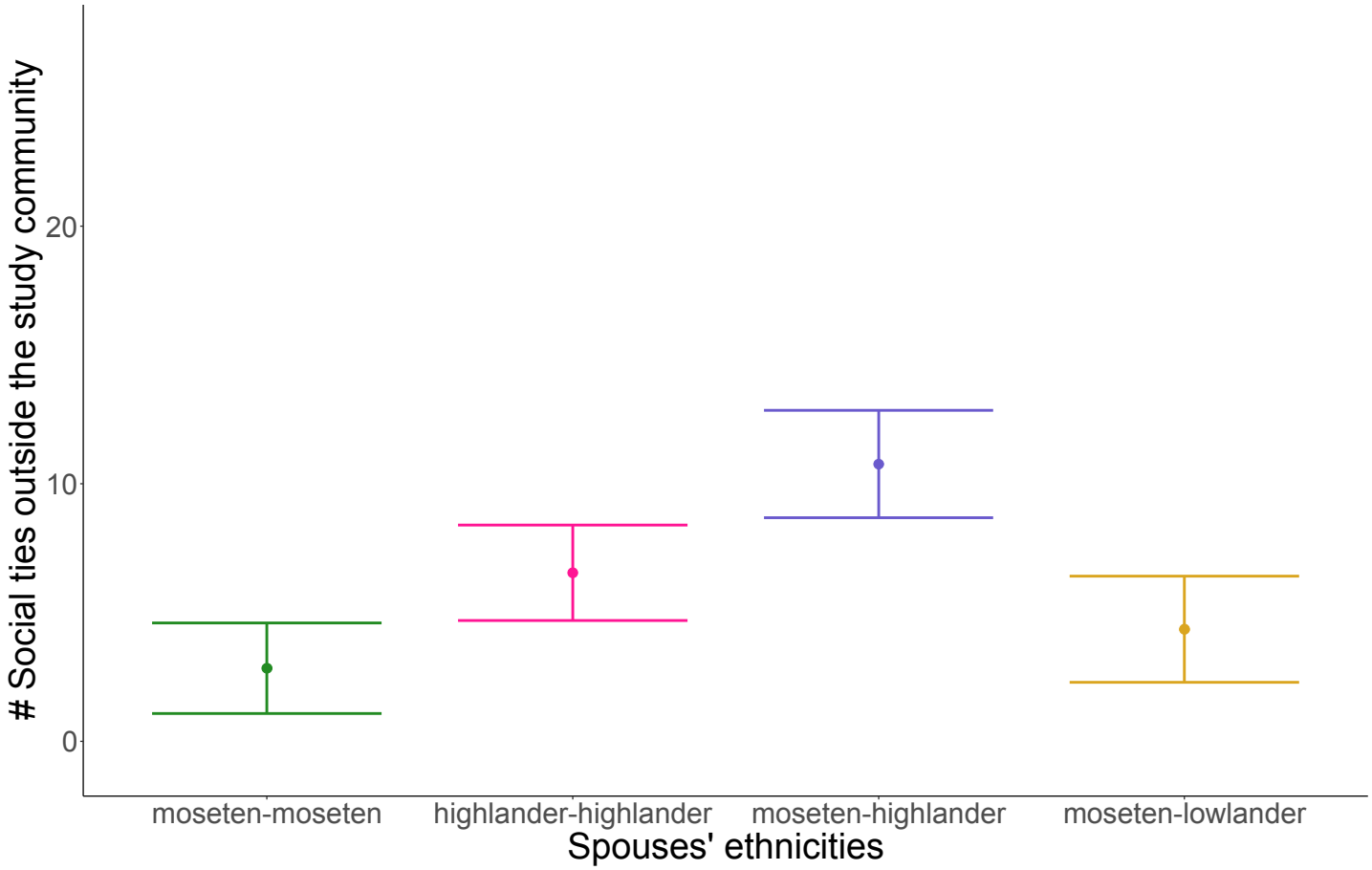

Table 1. Descriptive statistics by ethnic origins of spouses (N=155 couples)

	Mean (SD)			
Couples:	**Moseten-Moseten (N=50)**	**Highlander-Highlander (N=41)**	**Moseten-Highlander (N=31)**	**Moseten-Lowlander (N=33)**
Wives' age	39.9 (15.0)	37.2 (12.3)	32.9 (10.5)	34.7 (14.2)
Husbands' age	43.9 (15.0)	40.7 (12.3)	36.0 (10.4)	38.1 (13.2)
Wives' schooling	5.9 (4.4)	9.0 (4.1)	8.5 (4.3)	8.0 (4.1)
Husbands' schooling	6.9 (4.3)	9.9 (3.8)	9.5 (4.1)	8.3 (3.8)
Within village ties	16.0 (3.8)	15.9 (3.7)	17.8 (4.4)	16.6 (3.8)
Outside village ties	2.6 (2.9)	6.7 (5.9)	11.1 (8.7)	4.7 (5.7)
	Median (range)			
Household income in 2021 in BOB	24,943 (7,722 – 79,979)	30,556 (6,011 – 148,467)	34,889 (5,000 – 218,400)	24,111 (5,889 – 79,183)
Household income in 2015 in BOB	30,000 (5,000 -100,000)	40,000 (10,000- 100,000)	30,000 (1,000 - 100,000)	25,000 (5,000 - 100,000)

Table 2. Estimates from linear regression model of percentage of income from papaya sales prior to the onset of disease in 2015 for papaya growers (N=96).

	Estimate	SE	p-value
Spouses' ethnicities *[baseline: Moseten-Moseten couple]*			
Moseten-Highlander couple	-34.50	6.82	<0.001
Moseten-Lowlander couple	-9.25	6.80	0.18
Highlander-Highlander couple	-21.97	6.37	<0.001
Control variables			
Wife's age	-0.28	0.49	0.57
Husband's age	0.43	0.50	0.40
Wife's years of schooling	0.23	0.82	0.76
Husband's years of schooling	1.00	0.76	0.19
Household income in 2015 [log]	-3.78	3.51	0.29

Table 3. Estimates from linear regression model of number of coping strategies papaya growers (N=96) resorted to cope with the papaya disease.

	Estimate	SE	p-value
Spouses' ethnicities *[baseline: Moseten-Moseten couple]*			
Moseten-Highlander couple	0.17	0.34	0.61
Moseten-Lowlander couple	0.16	0.30	0.59
Highlander-Highlander couple	0.27	0.30	0.36
Control variables			
Wife's age	0.01	0.02	0.63
Husband's age	-0.00	0.02	0.98
Wife's years of schooling	0.07	0.04	0.06
Husband's years of schooling	0.01	0.03	0.75
Household income in 2015 [log]	0.01	0.00	0.12

Table 4. Estimates from linear regression models of percentage of 2015 income recovered by 2021 for papaya growers (N=96). Models adjust for spouses' age, years of schooling, reliance on papaya sales in 2015, and household income in 2021

	B (SE) p-value			
	Model 1	**Model 2**	**Model 3**	**Model 4**
Spouses' ethnicities *[Baseline: Moseten-Moseten couple]*				
Moseten-Highlander	40.65(19.21)	22.27(18.08)	20.52(17.69)	14.86(17.40)
couple	0.04	0.22	0.25	0.40
Moseten-Lowlander	5.10(16.66)	-1.22(15.30)	7.41(14.90)	2.94(14.64)
couple	0.76	0.94	0.62	0.84
Coping strategies				
Received remittances		63.37(14.94)		38.43(16.37)
		<0.001		0.02
Social networks' size				
# Social ties outside the			4.98(1.05)	3.63(1.17)
village			<0.001	<0.01
AIC	1052.25	1035.82	1031.59	1027.50

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4. DOES INTERMARRIAGE IMPROVE MINORITY INTEGRATION AND SOCIAL COHESION?

ABSTRACT

Widespread intermarriage is commonly viewed as a by-product of a society without group divisions, but to what extent and how might intermarriage itself challenge group boundaries? In this chapter, I investigate how the presence of intermarried couples and their progeny, being of mixed ethnicity, affects a community's social networks, attitudes towards diversity, and the salience of ethnic identities. I find intermarried individuals to be well-integrated into the study community's networks and act as bridges between different ethnic groups. Individuals of mixed ethnic heritage, however, tend to associate primarily with the Moseten majority, may have smaller social networks, and preferentially espouse Moseten or non-ethnic higher-order identities shared across groups. Although intermarried individuals, those of mixed ethnicity, and individuals who share more social ties with them hold more positive attitudes towards ethnic diversity, they are not more favorable to immigration to the region or improved minority rights within the study community. In sum, our findings suggest mixed effects on the role of intermarriage in eroding negative attitudes between groups, but positive effects of intermarriage as a potential accelerator of integration.

4.1. INTRODUCTION

"In a very fundamental way, we all of us distinguish those who are of our kind from those who are not of our kind by asking ourselves the question: 'Do we intermarry with them?'"

Edmund Leach (1967)

Contemporary societies are often made up of individuals from diverse ethnic and religious backgrounds. Harnessing the advantages of such diversity while minimizing conflict is at the forefront of political debates worldwide, and a central theme of social science research. Widespread intermarriage is commonly perceived as a sign that different groups in a society accept each other as equals, a "litmus test" of immigrants' and minorities' integration into mainstream society (Kalmijn, 1998; Rodriguez Garcia, 2015). As intergroup relations improve and barriers to social interaction across groups fade away, higher intermarriage rates and a greater social acceptance of intermarriage are to be expected (Alba & Nee, 2009; Kalmijn, 1998; Qian, 1997; Rodriguez Garcia, 2015). But can intermarriage itself challenge group boundaries and result in greater minority integration and social cohesion?

First, intermarriage can create or strengthen social ties between families and networks of individuals who belong to groups with none or few preexisting relationships between their members (Chapais, 2009; Lévi-Strauss, 1949; Rodríguez-García, Lubbers, Solana, & de Miguel-Luken, 2015). These novel or increased opportunities for interaction can foster cooperation and reduce prejudice

across groups, drawing attention to individual characteristics rather than group stereotypes, and improving attitudes towards culturally different individuals (Pettigrew & Tropp, 2005). Second, intermarriage can also produce children of multicultural heritage who may be less likely to identify themselves with a single group, more likely to interact across group boundaries, and who might be themselves more tolerant of cultural differences (Brunsma, 2005; Kalmijn, 2010; Lee & Beanjenlee, 2004; Lichter & Qian, 2018; Qian, 2004). Finally, both intermarried individuals and their children may act as "brokers", who in addition to bridging culturally different networks, may also facilitate communication across cultural boundaries. In the long run, the opportunities they create for harmonious interactions across groups can contribute to the integration of minority groups (Kalmijn, 1998; Rodríguez-García, Lubbers, Solana, De, et al., 2015; Song, 2009), harness potential benefits of diversity (Hoogendoorn et al., 2012; Stevens et al., 2008), and even lead to the development of a common ingroup identity in multicultural societies (Kalmijn, 1991; Pagnini & Morgan, 1990; Schroedter et al., 2015).

Empirically investigating whether intermarriage leads to greater minority integration and social cohesion, however, can prove difficult. Causal inference is particularly challenging as the nature of intergroup relations and norms favoring or discouraging intermarriage often coevolve. For instance, while both Smits (2010) and Demarest & Haer (2021) find that low intermarriage rates between different ethno-religious groups are predictive of violent conflicts between these groups in Eastern Europe and Sub-Saharan Africa respectively, these studies fail to address

whether the presence of more intermarried couples would have alleviated ethnic tensions and helped prevent armed conflict. Similarly, the bicausality of the relationship between intermarriage and minority integration is commonly debated in the sociology and economics literatures, with some researchers arguing minority integration into the predominant group's networks must come first and lead to intermarriage subsequently (Dribe & Nystedt, 2015; Gordon, 1964; Kantarevic, 2004), whilst others claim that intermarriage may also precede and lead to greater socioeconomic integration for minority groups (De Miguel Luken et al., 2015; Meng & Gregory, 2005; Scott & Cartledge, 2009).

Studies suggesting intermarriage leads to the building and/or strengthening of social ties between groups have primarily focused on examining the social networks of intermarried couples and their children in high-income industrialized populations. Studies conducted in Spain have shown that immigrants married to natives of Spanish origins count more individuals of Spanish descent in their networks than culturally endogamous immigrants who followed an otherwise similar migration trajectory (De Miguel Luken et al., 2015; Rodríguez-García, Lubbers, Solana, & de Miguel-Luken, 2015). These social ties were found to be made up of the partner, their family as well as friends known via the partner, suggesting intermarriage *leads* to more ties to the majority (De Miguel Luken et al., 2015). In the Netherlands, Kalmijn (2010) also found that children of mixed Dutch-Antillean or Dutch-Surinamese origins are more likely to have contact with individuals belonging to the Dutch majority than other individuals of non-mixed Antillean and Surinamese descent. And in the United States, Furtado & Theodoropoulos (2010) found that

immigrants of various origins have higher employment rates if they married natives (as opposed to other immigrants), due to the social network opportunities obtained through intermarriage.

Intermarriage, however, may not always translate into better integration into the majority's networks for the individuals involved. Strong norms against intermarriage commonly stem from the fear that intermarriage will threaten ingroup social cohesion and weaken ingroup social ties (Kalmijn, 1998; Rodríguez-García et al., 2016; Song, 2009). If the families and networks of intermarried couples oppose the marriage and/or perceive it negatively, avoiding contact with intermarried couples and their children can alternatively result in their social isolation (Herring, 1992; Rodríguez-García et al., 2016; Rodriguez Garcia, 2015; Song, 2009). These contradictory findings suggest intermarriage may only facilitate minority integration and foster intergroup cooperation in situations where there are preexisting incentives to seek out, or at the very minimum, tolerate interactions with outgroups. These may include contexts where intergroup competition is low and where interactions with outgroup members can lead to beneficial outcomes, including access to novel resources, or social ties that help buffer shortfalls resulting from idiosyncratic shocks (Dovidio et al., 1998; Judd & Park, 1988; Pan & Houser, 2013; Pisor & Gurven, 2016; Pisor & Ross, 2021). Furthermore, in contexts where resource access and socioeconomic status are associated with markers of group identity, the desirability of outgroup relationships, and that of intermarriage in particular, may be higher for members of groups whose status is perceived as lower (Bettencourt et al., 2001; Ellemers et al., 1999; Kalmijn, 1993; Pisor & Gurven,

2016; Telles, 2014). For example, marrying individuals of European descent in Brazil is commonly perceived to be more desirable for both Whites, Blacks and individuals of mixed race (Telles, 2014). This preference – which likely results from the high level of socioeconomic inequalities between Blacks and Whites and the historical legacy of *branqueamento* policies (promotion of interracial marriage to whiten the general population) – remains widespread despite high rates of intermarriage, a substantial mixed-race population, and a national discourse of racial democracy (Daniel, 2006; Dos Santos, 2002; Skidmore, 1990; Telles, 2014). Although much has been written on the integrative or isolating effects of intermarriage, little is known about the conditions that may favor or discourage positive attitudes towards intermarriage, and no study to our knowledge has explicitly tested whether and when individuals who are intermarried or whose parents are intermarried may act as bridges that foster intergroup cooperation at a broader societal level.

Goals of study

In this chapter, I investigate how the presence of individuals who are intermarried or whose parents are intermarried, affects the study community's social networks, individual access to social ties outside the community, tolerance of minority groups, and the development of non-ethnic superordinate identities. I start by investigating the extent to which ethnicity plays a role in shaping social ties in the village (1). Secondly, I examine whether individuals who are intermarried or whose parents are intermarried are relatively more integrated than their ethnically endogamous and non-ethnically mixed counterparts (2), and whether they act as bridges between the

different ethnic groups present within the village (3). I examine social ties along contextually relevant domains of support including support finding a job, support with food sharing, support with loans, material support during the COVID-19 pandemic, support with acquisition of arable land and support with childcare (all directed networks). I also reconstruct *Aine* networks – a form of reciprocal labor partnership of Andean origins which is widespread in the study community (e.g., mutual support during harvest, for clearing field etc.) – as well as friendship networks including close friends (i.e., individuals with whom one share close personal matters) and other friends (i.e., individuals one likes to invite over or with whom one likes to spend time during a party) (all undirected networks). Examining networks along multiple dimensions allows me to explore under which circumstances individuals who are intermarried, or whose parents are intermarried, may be more likely to act as bridges between groups (3). Fourthly, I investigate whether intermarriage leads to greater integration into the broader Bolivian society for Moseten by assessing whether Moseten who are intermarried or whose parents are intermarried have more social ties outside the community (i.e., in neighboring *Intercultural* villages, major towns, and other villages in the Highlands and Lowlands of Bolivia) (4). I then examine whether being intermarried or having intermarried parents (5) or more social ties to intermarried and ethnically mixed individuals (6) lead to greater tolerance of minority groups and more positive attitudes towards diversity for Moseten. Finally, I examine whether being of mixed ethnicity results in the adoption of non-ethnic superordinate identities (7).

The study community provides a unique context for exploring these questions. The relatively small community size allows me to reconstruct almost full community social networks and examine the effects of intermarriage and multiethnicity on network structure. Furthermore, reliance on social ties is particularly important as access to formal institutions for managing risk remains limited. For example, only 17% of villagers report having received a loan from a bank in 2021, and only 14% have bank savings. Given preferential access to different types of resources for different ethnic groups (see chapters 1-2), there are reasons to expect intermarried individuals and their children to be particularly central to community networks or help provide access to social ties outside the community. Finally, the importance of identity politics within the study community and the broader Bolivian context (see general introduction, pages 7-16) provides a unique opportunity for examining the effects of intermarriage on minority integration and the development of higher-order identities.

4.2. METHODS

Data collection protocols and data collected are described in the introduction section (pages 16-22). Social networks are constructed using the `igraph` package (Csardi et al., 2006) and analyzed using the `statnet` suite of packages (Handcock et al., 2019) in R version 4.1.2.

To examine the association between ethnicity and villagers' supportive relationships (1), I model the social support networks within the village using

exponential random graph models (ERGMs), which predict the likelihood of a tie given individual and interpersonal characteristics.

To determine whether individuals who are intermarried or whose parents are intermarried are socially isolated (2), I calculate across all networks the villagers' degree, eigenvector and betweenness centrality measures. Degree centrality measures the number of unique social partners for each individual; eigenvector centrality is a measure of how well connected an individual is to other well-connected individuals; and betweenness centrality measures the number of shortest paths in a network that pass through a person (Kolaczyk & Csárdi, 2014). A high betweenness centrality indicates than an individual serve as a "bridge" that helps connect individuals clustered in different parts of a network (Kolaczyk & Csárdi, 2014). I examine associations between these network metrics, intermarriage and parents' ethnicity in regression models adjusting for age, gender, marital status, years of schooling, wealth, and number of biological and affinal kin in the community.

To assess whether intermarried and multiethnic individuals bridge the social networks of different ethnic groups (3), I calculate villagers' bridge betweenness centrality for all networks and investigate whether it is associated with intermarriage and/or having intermarried parents in linear regression models adjusting for the same covariates as above. Bridge betweenness centrality is a social network metric representing the number of times an individual B lies on the shortest path between individuals A and C, where A and C belong to different ethnic groups (Christensen et al., 2021; Jones et al., 2021). A high bridge betweenness centrality indicates that

an individual act as “bridge” that help connect different ethnic groups within the community. I examine associations between intermarriage, mixed ethnicity and bridge betweenness centrality both across networks (average bridge betweenness across networks), and separately for each individual network.

To examine whether Moseten who are intermarried or whose parents are intermarried have more social ties outside the community (4), I calculate the number of unique social ties (i.e., degree) Moseten and mixed Moseten have with alters who reside outside the community across all networks and examine its relationship with intermarriage and parent’s ethnic origins in a linear regression model adjusting for age, gender, schooling and wealth.

Tolerance of minority groups and attitudes towards diversity (5-6) are measured along five dimensions: general attitude towards ethnic diversity, attitude towards intermarriage; extent to which participant believes ethnic diversity and intermarriage pose a threat to Moseten culture, attitude towards immigration to the study community and attitude towards minority rights in the community. Associations between these measures, intermarriage and mixed descent (5) and number of ties with intermarried or mixed Moseten (6) are assessed through general linear models adjusting for age, gender, marital status, spouse ethnicity, years of schooling and wealth.

Association between having intermarried parents and the adoption of a higher-order identity (7) is examined with a logistic regression model adjusting for the same covariates as above.

All analyses with the exception of (4) are limited to adult residents of the village (N=409), 92% of whom were interviewed (N=376).

4.3. RESULTS

Descriptive statistics

Interviewees named 21 individuals from within the community as providing them with some kind of support, of which 15 are from the same ethnic group. Summary statistics by network item are shown in table 1. In all networks, Moseten appear to form larger clusters than Highlanders and Lowlanders, suggesting minority groups may be relatively isolated (figure 1). Friendship networks have the highest density (figure 1:H-I). Network of support acquiring arable land has very low transitivity (i.e., few adjacent interconnected nodes) because the vast majority of villagers nominated the community *casique* (village chief) as the primary source of support (figure 1:C, table1). There is surprisingly little food sharing within the community, and most of it happens primarily between close kin or spouses (figure 1:D).

Interviewees named on average 3.5 alters (range= 0-39 alters; 1315 edges in total) from outside the community. The majority of extra-community ties are the result of explicitly asking villagers about their family and friends outside the community (30%) or alters named when inquired about support getting a loan (26%) or support finding a job (19%).

Study participants have higher tolerance scores, on average, for ethnic diversity and towards intermarriage than towards immigration or minority rights (table 2).

Most ethnic Moseten (67.2%) prefer to self-identify as such, whereas only 24.7 % of Highlanders and 27.9% of Lowlanders prefer to self-identify with their ethnic group (figure 2). No individual with mixed Moseten-Highlander or Moseten-Lowlander origins identifies as Highlander or Lowlander (figure 2). 16.9% of ethnic Highlanders and 32.6% of ethnic Lowlanders prefer to self-identify as Moseten despite not having any Moseten ancestry (figure 2). “Castellano”, “Indigenous” and “Bolivian” are shared identities espoused across ethnic groups (figure 2). Therefore, they are analyzed as a single category of higher-degree identities in subsequent analyses.

What role does ethnicity play in shaping the social support networks of the village?

Across all social network domains, homophily by ethnicity is a strong driver of tie formation (ORs=1.13-2.31) (figure 3). The tendency towards ethnic homophily is greatest for friendship ties with close friends and other friends having 2.13 (p <0.001) and 2.31(p <0.001) greater odds of being of the same ethnicity respectively (figure 3: models 8-9).

Are individuals who are intermarried or whose parents are intermarried better integrated or more socially isolated?

Across all support, labor, and friendship networks, intermarried individuals do not appear to be better integrated nor more socially isolated than those married to co-

ethnics. Degree, eigenvector and betweenness centrality estimates are similar for intermarried and ethnically endogamous individuals (table 3).

Having intermarried parents is associated with lower degree centrality for mixed Moseten-Highlander individuals who have on average 6.18 (p=0.04) fewer social ties across all networks relative to individuals whose both parents are Moseten (table 3), but there are no association between having mixed origins and eigenvector or betweenness centrality (table 3).

Do intermarried and mixed ethnic participants act as bridges between groups?

Intermarried individuals have 28%(p=0.02) higher bridge betweenness centrality relative to their endogamous counterparts when averaged across all networks (figure 4). Number of consanguineal and affinal kin partially mediate this relationship and is positively associated with bridge betweenness (Appendix C, table 1). The direction of the relationship between intermarriage and bridge betweenness is positive for all domains with the exception of food sharing (figure 4: model 4). However, it is only significant or close to significance in three support networks: finding a job (B=0.40; p=0.06) (figure 4: model 1), childcare (B=0.24; p=0.05) (figure 4: model 5), and close friendships (B=0.85; p=0.04) (figure 4: model 8).

Unlike the case for being intermarried yourself, being a child of intermarried parents is not significantly associated with differences in bridge betweenness centrality when averaged across all networks (figure 5). There is a small positive association between bridge betweenness and mixed ethnicity in networks of support

with land acquisition and food sharing (figure 5: models 3-4). However, the inconsistency of this result for other network items suggests these associations are likely spurious (figure 5). Instead, I find participants with mixed Moseten-Highlander and Moseten-Lowlander origins tend to associate preferentially with Moseten (74.76% and 81.82% of social ties across networks respectively) (figure 1). There are no significant interactions between intermarriage and ethnic origins in models of bridge betweenness centrality.

Do intermarried Moseten and those of mixed ancestry have more social ties outside the study community?

Relative to ethnically endogamous Moseten, Moseten intermarried to Highlanders and Moseten intermarried to Lowlanders have on average 2.28 (p<0.001), and 1.26 (p=0.03) more social ties outside the study community, respectively (figure 6)

Relative to individuals whose both parents are Moseten, individuals with one Moseten parent and one Highlander or Lowlander parent have on average 1.06 (p=0.08) and 1.26 (p=0.02) more social ties outside the community, respectively (figure 7).

Are intermarried individuals and those of mixed ancestry more tolerant of minority groups?

Relative to ethnically endogamous Moseten, Moseten intermarried to Highlanders have more positive attitudes about ethnic diversity (B=0.47; p=0.03) (figure 8), while Moseten intermarried to Lowlanders are less likely to believe intermarriage and

ethnic mixing pose a threat to Moseten culture (B=-0.43; p=0.04) (figure 8). However, intermarriage to either Highlanders or Lowlanders is not significantly associated with better or worse attitudes towards intermarriage, immigration to the study community or efforts to improve minority rights (figure 8).

Relative to individuals whose both parents are Moseten, individuals with one Moseten and one Highlander parent have more positive attitudes towards ethnic diversity (B=0.54; p<0.01) and intermarriage (B=0.41; p=0.05) (figure 9). However, they do not hold significantly more positive or negative attitudes towards immigration to the study community and efforts to improve minority rights in the village and are no more likely than ethnic Moseten to believe that diversity and ethnic mixing pose a threat to Moseten culture (figure 9). We find no associations between proxies of tolerance and having mixed Moseten-Lowlander ethnic origins (figure 9).

Are Moseten with more ties to intermarried Moseten or mixed Moseten more tolerant of minority groups?

Moseten who have more social ties with intermarried Moseten or individuals with mixed Moseten-Highlander or mixed Moseten-Lowlander origins have more positive attitudes towards ethnic diversity. For each additional tie with an intermarried or mixed Moseten, their tolerance towards ethnic diversity score increases by 0.1 SD (p<0.01) (figure 10). However, they do not score higher on any other measures of tolerance.

Are participants of mixed ethnicity more likely to espouse a higher-order non-ethnic identity shared across groups?

Relative to participants whose both parents are Moseten, mixed Moseten-Highlanders have 2.96 (p=0.02) greater odds of espousing a higher-order identity shared across groups (table 4). However, relative to participants whose both parents are Highlanders, they are not more or less likely to prefer identifying with a higher-order identity (table 4). Mixed Moseten-Lowlanders are not more or less likely to espouse a higher-order identity relative to fully ethnic Moseten or fully ethnic Lowlanders (table 4). Instead, they have 1.98 (p<0.01) greater odds of identifying with as Moseten relative to participants whose both parents are Lowlanders (table 4).

Each additional year of age is associated with 3% (p<0.01) lower odds of identifying with a higher-order identity irrespective of ethnic origins and intermarriage (table 4), while older (OR=1.03; p<0.01) and wealthier (OR=1.11; p=0.05) adults are more likely to identify as Moseten (table 4).

4.4. DISCUSSION

Although intermarriage is commonly viewed as both a correlate and driver of group boundary dissolution (Kalmijn, 1998; Rodriguez Garcia, 2015), few studies have empirically evaluated the validity of this assumption or investigated the pathways by which intermarriage may lead to greater minority integration and social cohesion. Here, I examined the extent to which ethnicity affects the formation of social support ties (1), whether intermarriage and mixed descent is associated with greater

integration (2), whether intermarried individuals and those of mixed descent act as "bridges" between different ethnic groups (3), have access to more social ties outside the community (4), and are more tolerant towards minority groups (5). I also examined whether having more social ties with intermarried individuals and individuals of mixed descent leads to greater tolerance of minority groups (6), and finally whether individuals of mixed descent tend to espouse super-ordinate identities (7).

I find ethnicity plays an important role in shaping social ties (1). In all networks examined, ties are more likely to form between co-ethnics. These findings are reflected in general attitudes towards ethnic outgroups in the study community, where negative stereotypes persist despite tolerant attitudes towards ethnic diversity. Friendship networks are characterized by particularly high degree of ethnic homophily relative to more pragmatic domains of social support, consistent with the literature on homophily in industrialized populations which suggests homophily by ethnicity and race play a more important role in structuring friendship networks than any other demographic characteristic including age, religion, socioeconomic status and gender (McPherson et al., 2001).

Across network items, intermarriage is not associated with more social ties or more well-connected social ties, nor is it associated with a propensity to bridge ties across different network clusters (2). Consistent with generally tolerant attitudes towards intermarriage in the study community, these findings suggest intermarried villagers are not penalized by being more socially isolated relative to ethnically endogamous villagers, nor are they particularly influential within the study

community. Intermarried individuals, however, have a significantly greater propensity to bridge ties specifically across ethnic clusters (3), in accordance with the idea that intermarriage may help create or strengthen social ties between groups. Intermarried individuals' propensity to act as bridges between groups is consistent across networks, although it is greatest in networks of close friendships, followed by support networks aimed at finding a job and for childcare (3).

Individuals with one Moseten parent and one Highlander parent have on average fewer social ties relative to individuals whose both parents are Moseten (but not individuals whose both parents are Highlanders), suggesting they may be relatively more socially isolated relative to fully ethnic Moseten. Unlike intermarried participants, participants whose parents are intermarried do not bridge ties across ethnic clusters. Instead, they appear to associate preferentially with individuals from the Moseten majority. Both of these findings may be the result of the high degree of ethnic homophily in the study community, combined with a tendency for Moseten networks to be much more interconnected than Highlander or Lowlander networks. Although I do not find bridging effects for ethnically mixed participants in the current sample, future studies may yield different results for the next generations of ethnically mixed individuals, especially the children of Moseten-Highlander couples, as the Highlander population continues to grow in the study community.

Both intermarried and ethnically mixed participants have more social ties outside the study community (4). The majority of these alters are relatives and friends who reside in neighboring intercultural communities (19%), the neighboring town of Palos Blancos (16%), the major cities of La Paz (36%) and Cochabamba

(12%), or in other villages, towns and cities in the highlands or lowlands of Bolivia (17%). Although intermarriage itself may be the result of having more connections outside the study community, the fact that individuals whose parents are intermarried also have more extra-community social ties – many of which are ties with unrelated friends (26%) – suggests intermarriage may lead to greater integration into the broader Bolivian society. Future research will examine the social networks of a neighboring *intercultural* community in tandem with those of the study community to further investigate whether intermarried Highlanders and their descendants help bridge ties between Moseten and *intercultural* communities in Alto Beni.

Surprisingly, intermarriage does not lead to more positive attitudes towards immigration, intermarriage, or efforts to improve minority rights in the study community. However, Moseten intermarried to Lowlanders are less likely believe that ethnic diversity and mixing pose a threat to the preservation of Moseten culture, while Moseten intermarried to Highlander hold more positive attitudes towards ethnic diversity (5). Similarly, individuals of mixed ethnic origins do not hold more favorable attitudes towards immigration or improved minority rights within the village, although Moseten-Highlanders are more favorable to intermarriage and more likely to believe ethnic diversity leads to positive societal outcomes (5). Moseten with more social ties to intermarried Moseten or Moseten of mixed ethnicity were also found to hold more positive attitudes towards ethnic diversity, but not other measured dimensions of tolerance (6). These results are consistent with research showing that long-term exposure to diversity (e.g. having a partner of

friends of different ethnicities, growing up in a multicultural family) leads to more progressive and more cosmopolitan attitudes (Davenport, 2016). In general, tolerance of intermarriage and ethnic diversity in the study community stand in striking contrast to the negative attitudes towards immigration and efforts to improve minority rights, analogous to “Not In My Backyard”(NIMBYism) phenomena in the United States, in which development projects and social initiatives such as resettlement of refugees (Ferwerda et al., 2017) or neighborhood racial desegregation through affordable housing (Scally & Tighe, 2015) are perceived as less appropriate within one’s own community relative to elsewhere at the regional or national levels.

Effects of having intermarried parents on the adoption of higher-order identities yield different results for Moseten-Highlanders and Moseten-Lowlanders (6). Moseten-Highlanders are equally likely as fully ethnic Highlanders to espouse a higher-order identity common across groups, but much more likely to do so relative to fully ethnic Moseten. Furthermore, across ethnic groups and irrespective of having intermarried parents, younger age is highly predictive of preferring to espouse a higher-order identity. Given the cross-sectional nature of our data and sample size limitations, it is unclear whether these results suggest an emergence of superordinate identities for Moseten-Highlanders, or whether they simply reflect a tendency to espouse the preferred identity of their Highlander parent. Moseten-Lowlanders, on the other hand, tend to identify as Moseten. These findings may reflect the greater assimilation of both Moseten-Lowlanders and Lowlanders into Moseten culture relative to Highlanders and Moseten-Highlanders. This relatively

greater assimilation may be the result of the heterogeneity of the Lowlander category, which is composed of multiple culturally similar but distinct ethnic groups with very small source population sizes (thus more likely to assimilate), and/or cultural proximity between Moseten and Lowlanders due to traditionally similar subsistence practices and a longer history of intermarriage (Bathurst, 2005; Dudley, 2009; Pakendorf et al., 2003; Thomas & Van Damme, 2010; Zeballos, 2017). Despite these differences in preferred self-identification between Moseten-Highlanders and Moseten-Lowlanders, these findings nevertheless suggest a tendency for individuals of mixed ethnic origins to abandon the identity of minority groups to the benefit of assimilating with the Moseten majority or the broader "Castellano" culturally predominant group in Bolivia.

A longstanding idea in anthropology is the importance of marriage and the affinal relationships that follow in creating or strengthening ties between groups of extended families, clans or villages (Chagnon, 1968; Chapais, 2010, 2013; Lévi-Strauss, 1949; Rodseth & Wrangham, 2004). Taken together, our findings suggest that in a context where ethnicity plays an important role in structuring social relationships, intermarriage may similarly help bridge ties across ethnic groups. For indigenous peoples, intermarriage may also facilitate or accelerate integration into national society and markets, and lead to more cosmopolitan attitudes in future generations. However, intermarriage does not necessarily lead to more progressive attitudes towards immigration and minority rights at the local level.

Figure 1. Social support, labor and friendship networks of the study community (N=409)

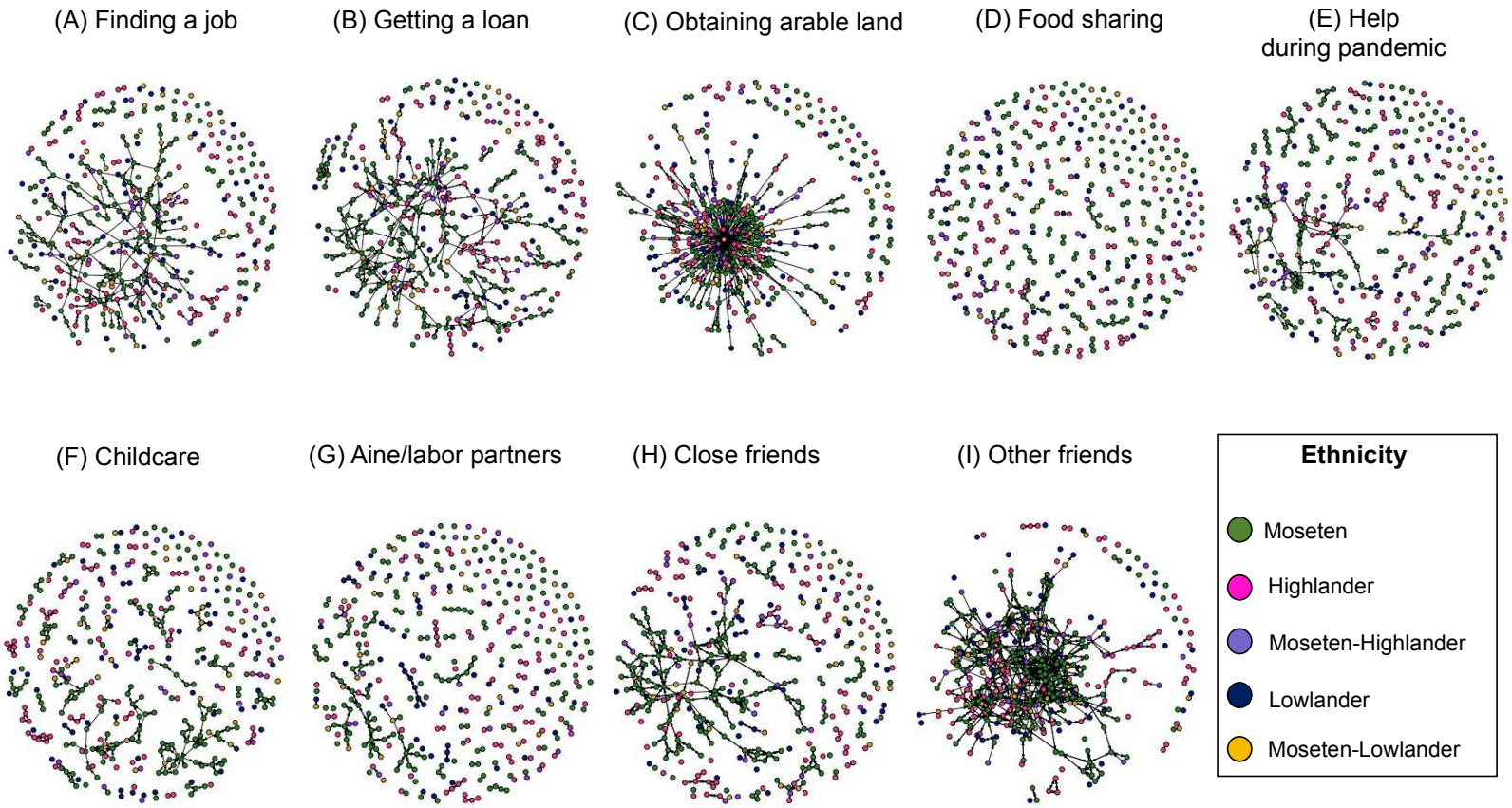

Figure 2. Preferred self-identification by ethnic origins (N=376)

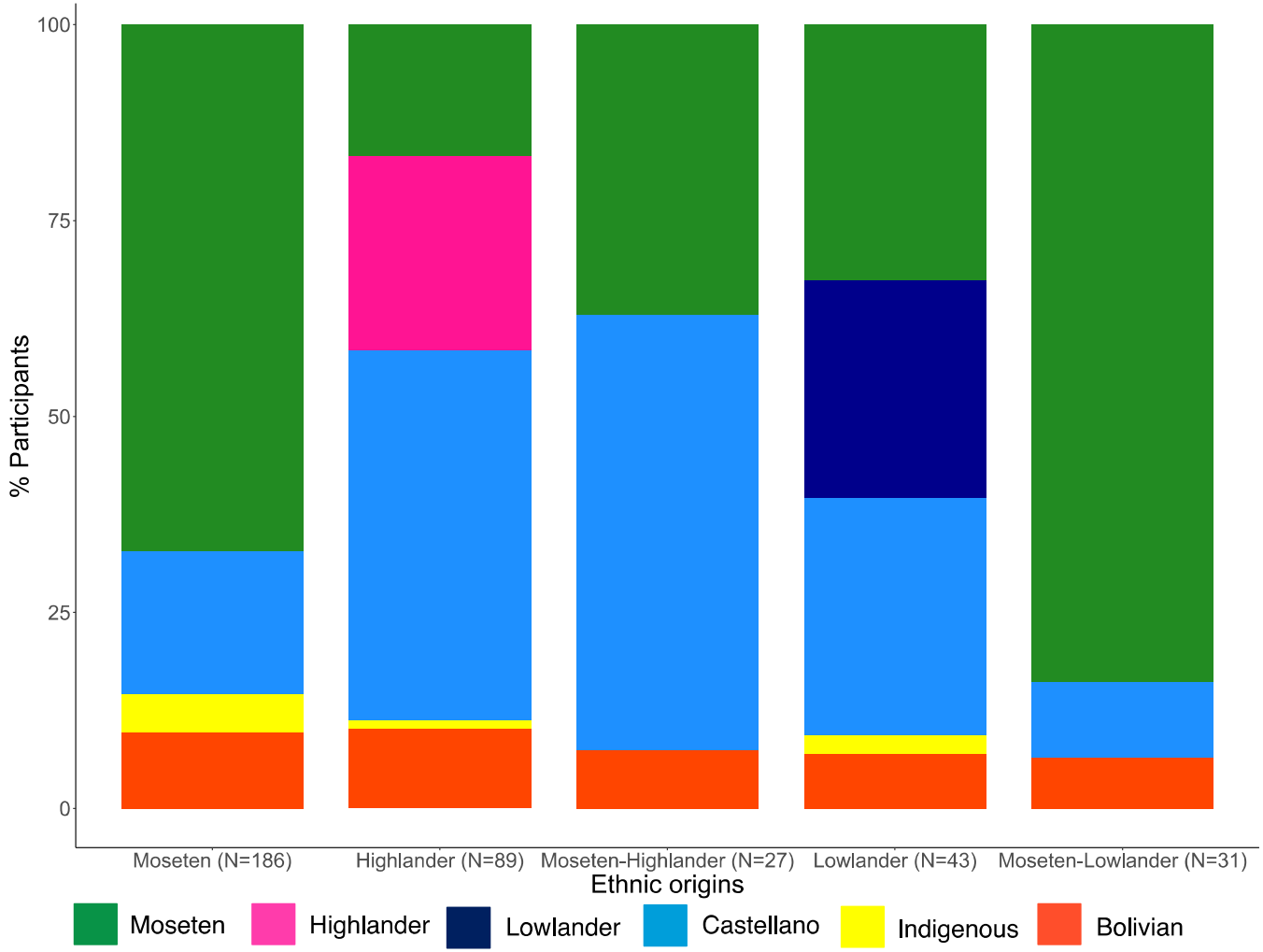

Figure 3. Odds of within ethnic group ties. Odds ratios from ERGM for each network indicated by circles; bars denote 95% Cis.

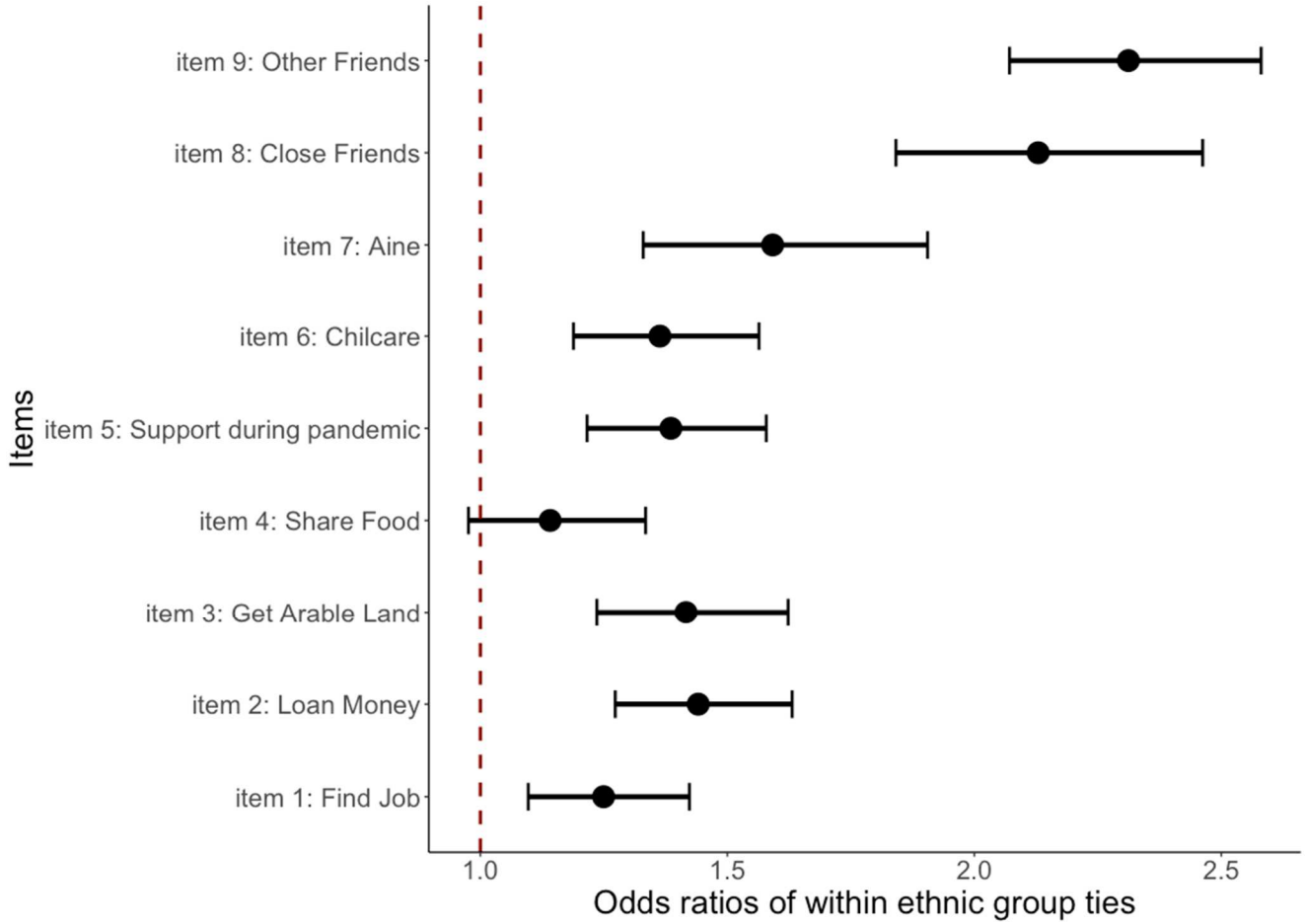

Figure 4. Percent difference in bridge betweenness between intermarried and endogamous villagers. Estimates from linear regression models indicated by circles for individual networks and diamonds when averaged across networks; bars denote 95% CIs; models adjusting for age, gender, ethnicity, marital status, years of schooling, wealth, and number of consanguineal and affinal adult kin in the community; N=376 across all models.

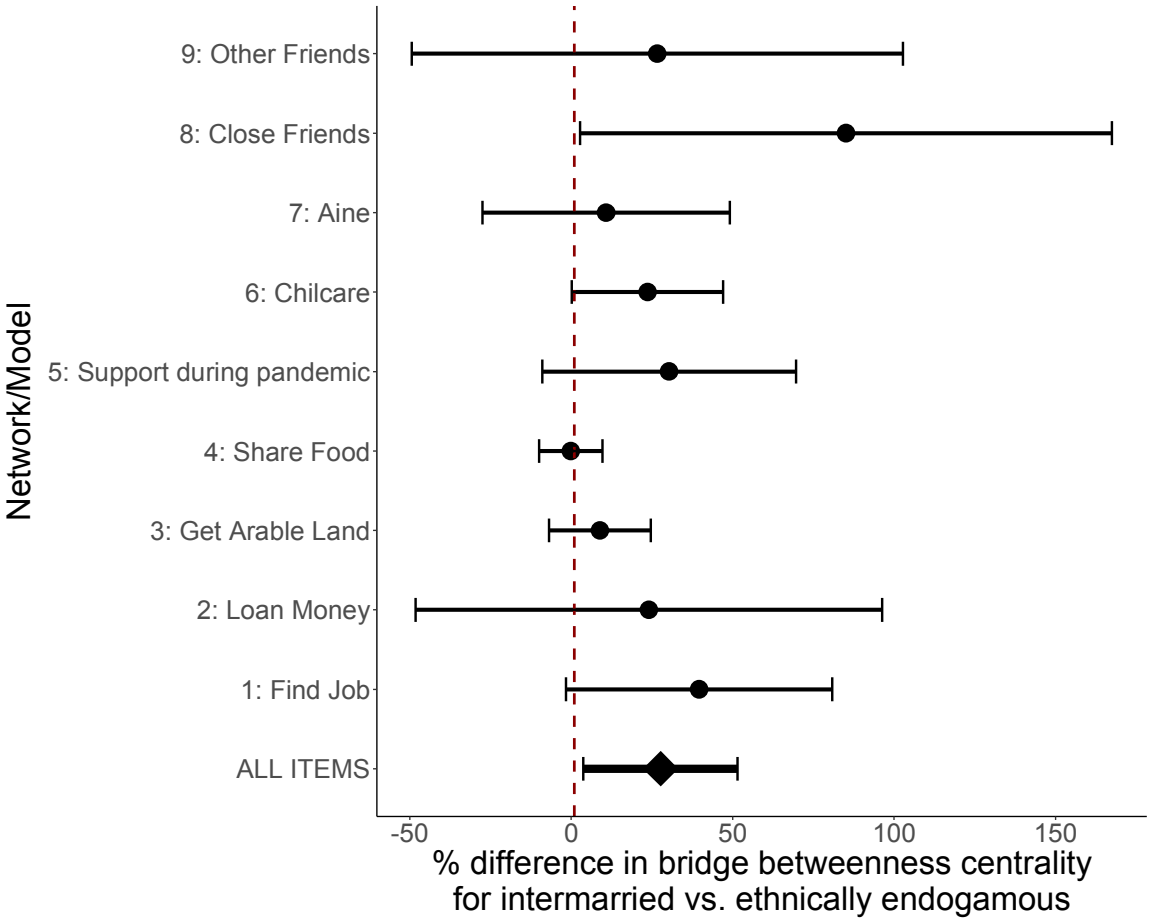

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Figure 5. Percent difference in bridge betweenness by ethnic origins/ parents' ethnicity. Estimates from linear regression models adjusting for age, gender, ethnicity, marital status, years of schooling, wealth, number of consanguineal and affinal adult kin in the community; N=376 across all models.

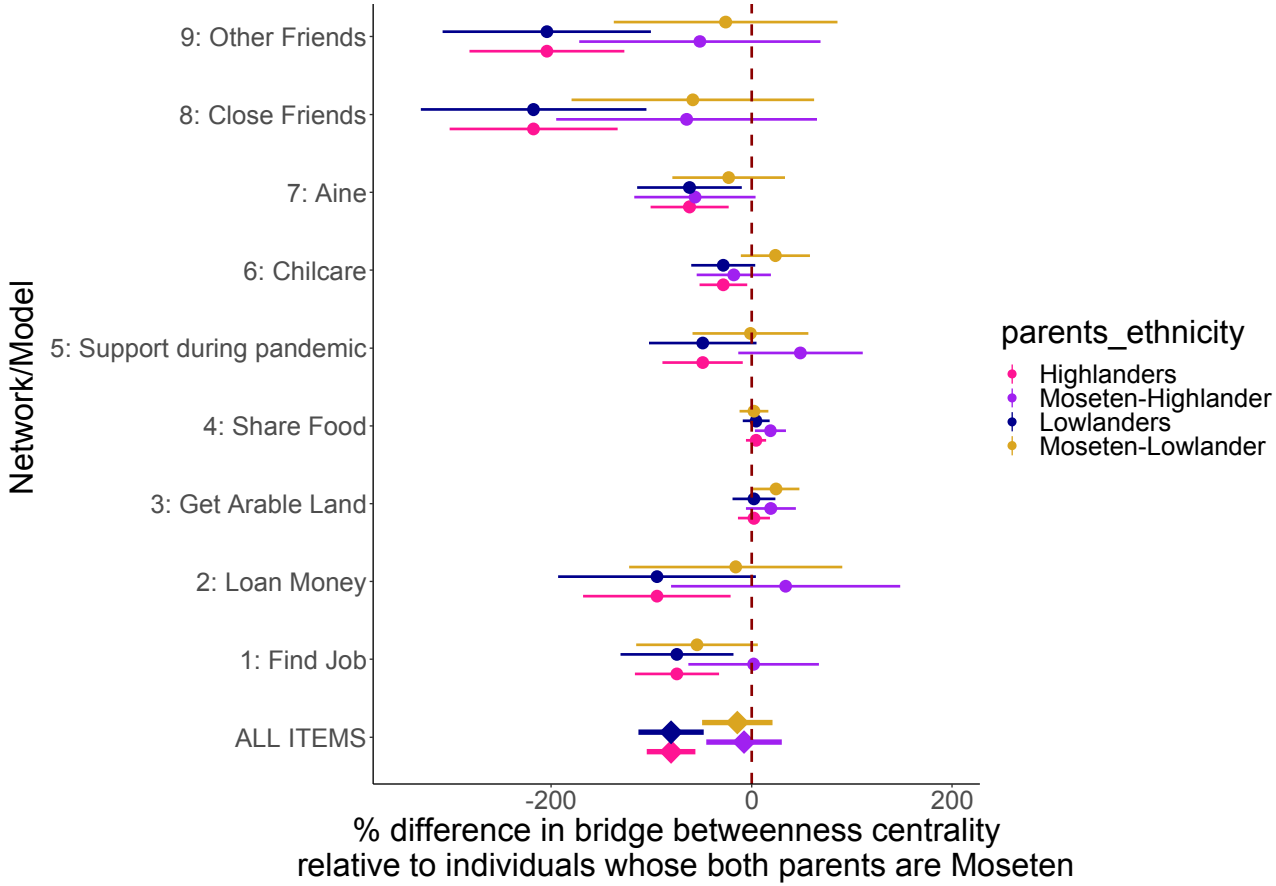

Figure 6. Number of social ties outside the study community for Moseten and mixed Moseten participants (N=244). Estimates from linear regression models adjusting for age, gender, years of schooling, and wealth.

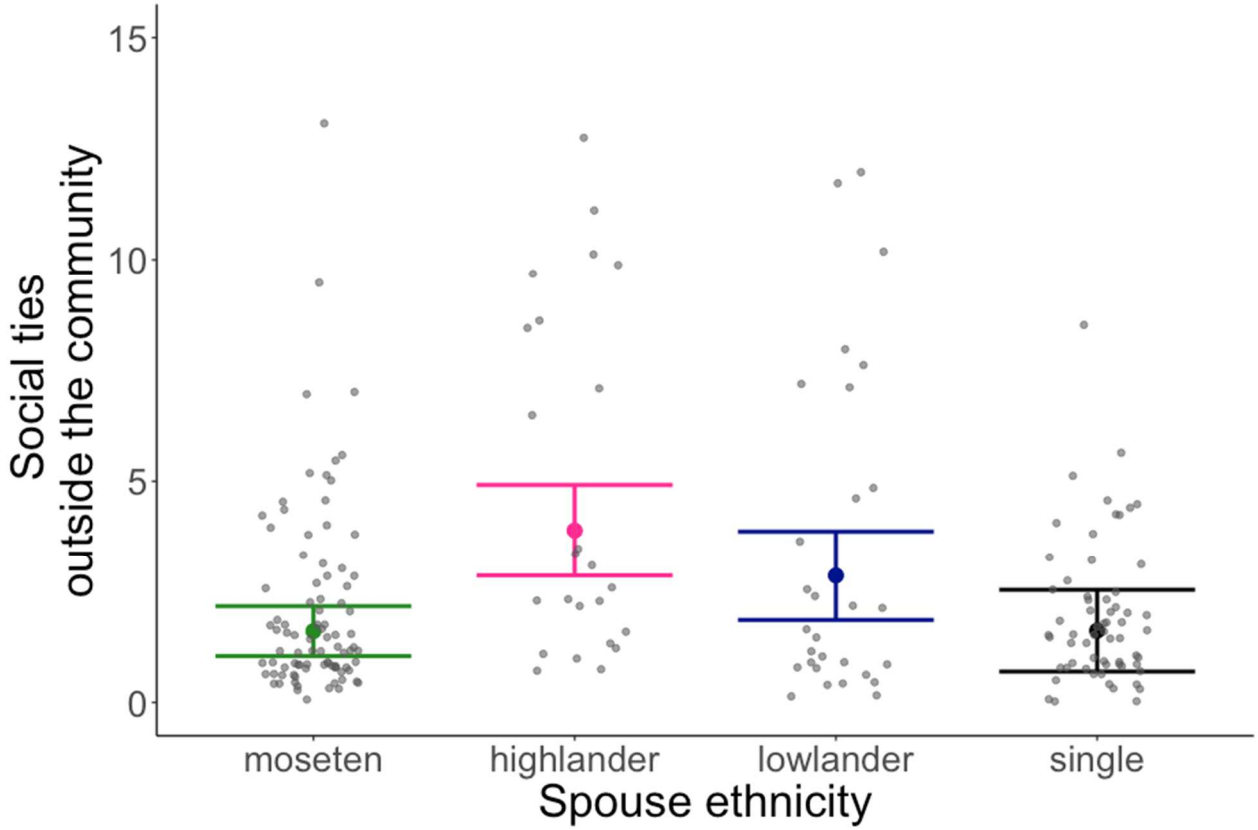

Figure 7. Number of social ties outside the study community for Moseten, mixed Moseten-Highlanders, and mixed Moseten-Lowlanders (N=244). Estimates from linear regression models adjusting for age, gender, marital status, spouse ethnicity, years of schooling, and wealth. Error bars represent standard errors of the predicted mean value. Points represent partial residuals.

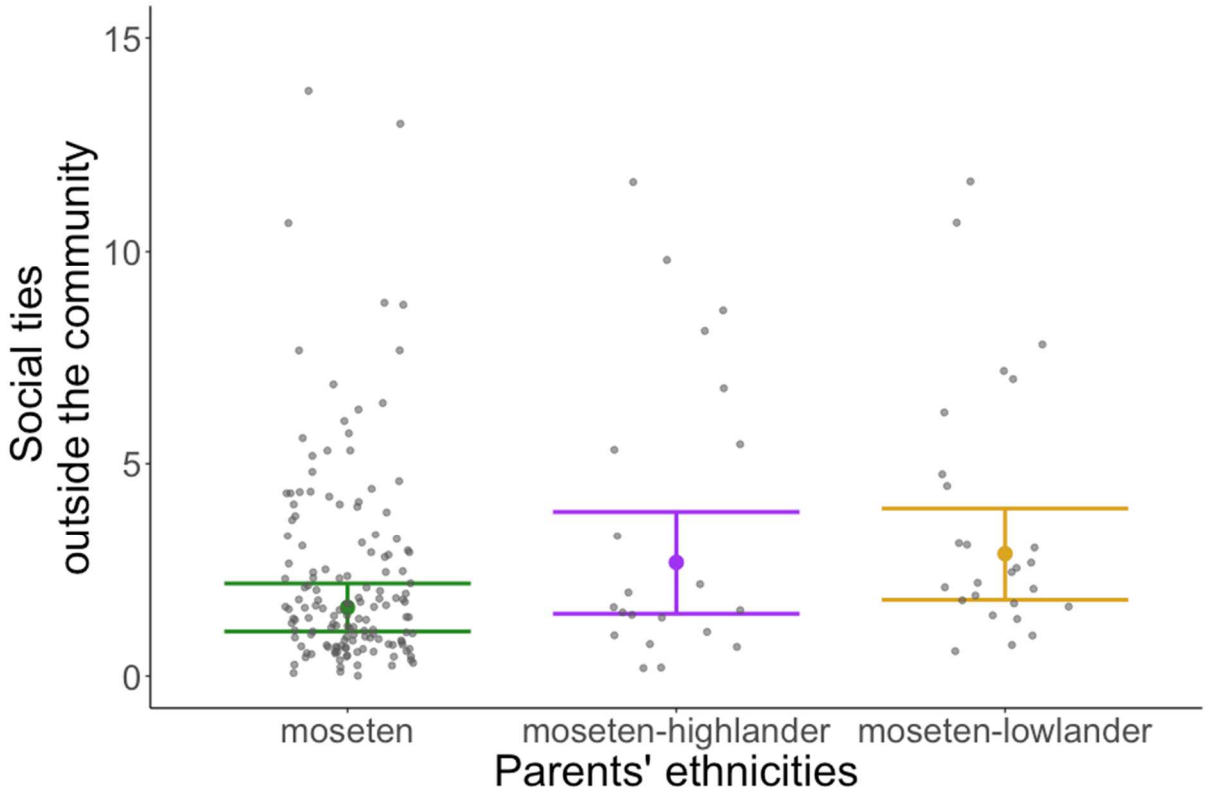

Figure 8. Tolerance scores for intermarried vs. ethnically endogamous Moseten. Standardized estimates from linear regression models indicated by circles (N=170); bars denote 95% CIs; models adjusting for age, gender, marital status, spouse ethnicity, years of schooling and wealth.

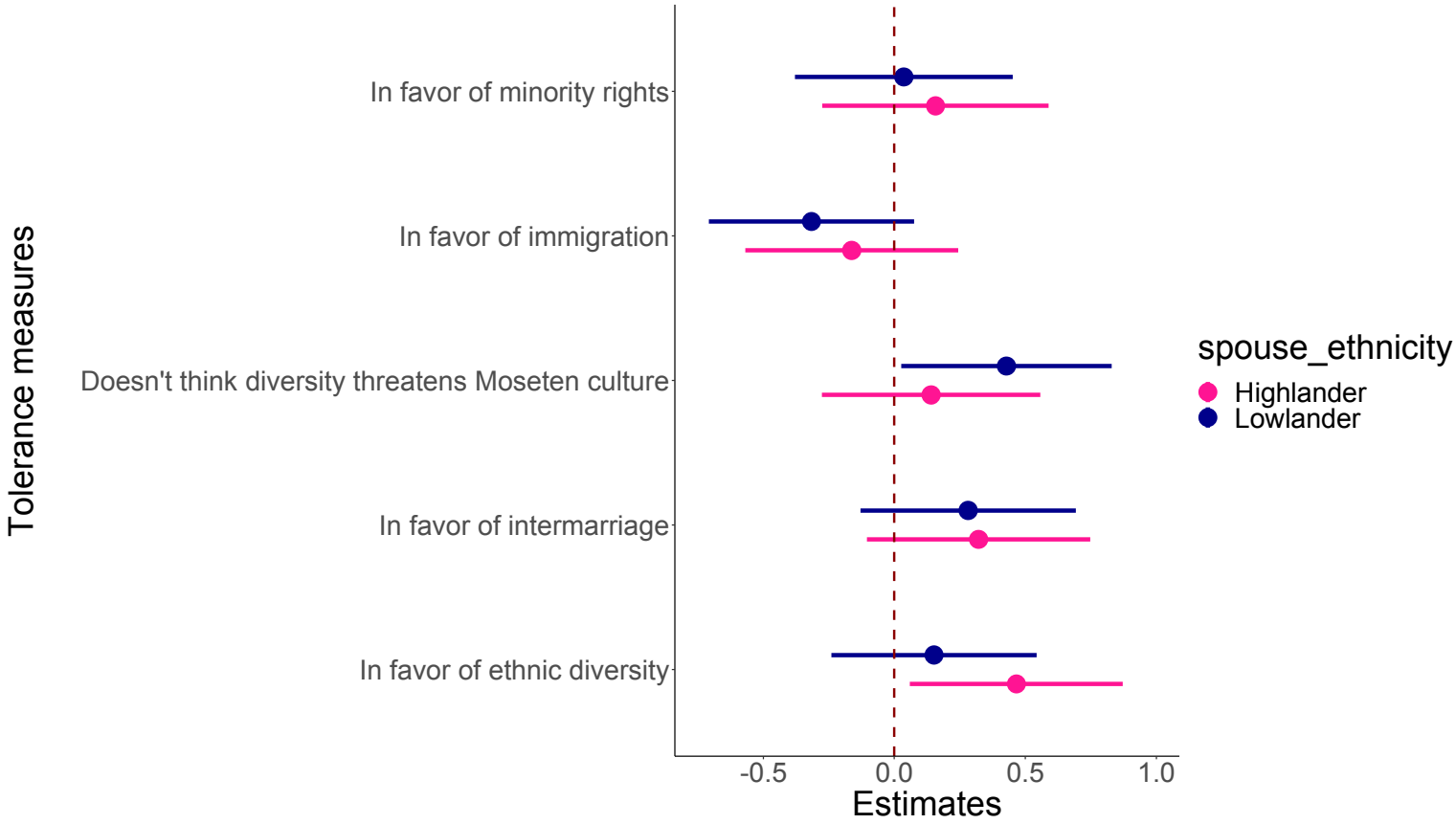

Figure 9. Tolerance scores for mixed Moseten relative to fully ethnic Moseten. Standardized estimates from linear regression models indicated by circles (N=244); bars denote 95% CIs; models adjusting for age, gender, marital status, spouse ethnicity, years of schooling and wealth.

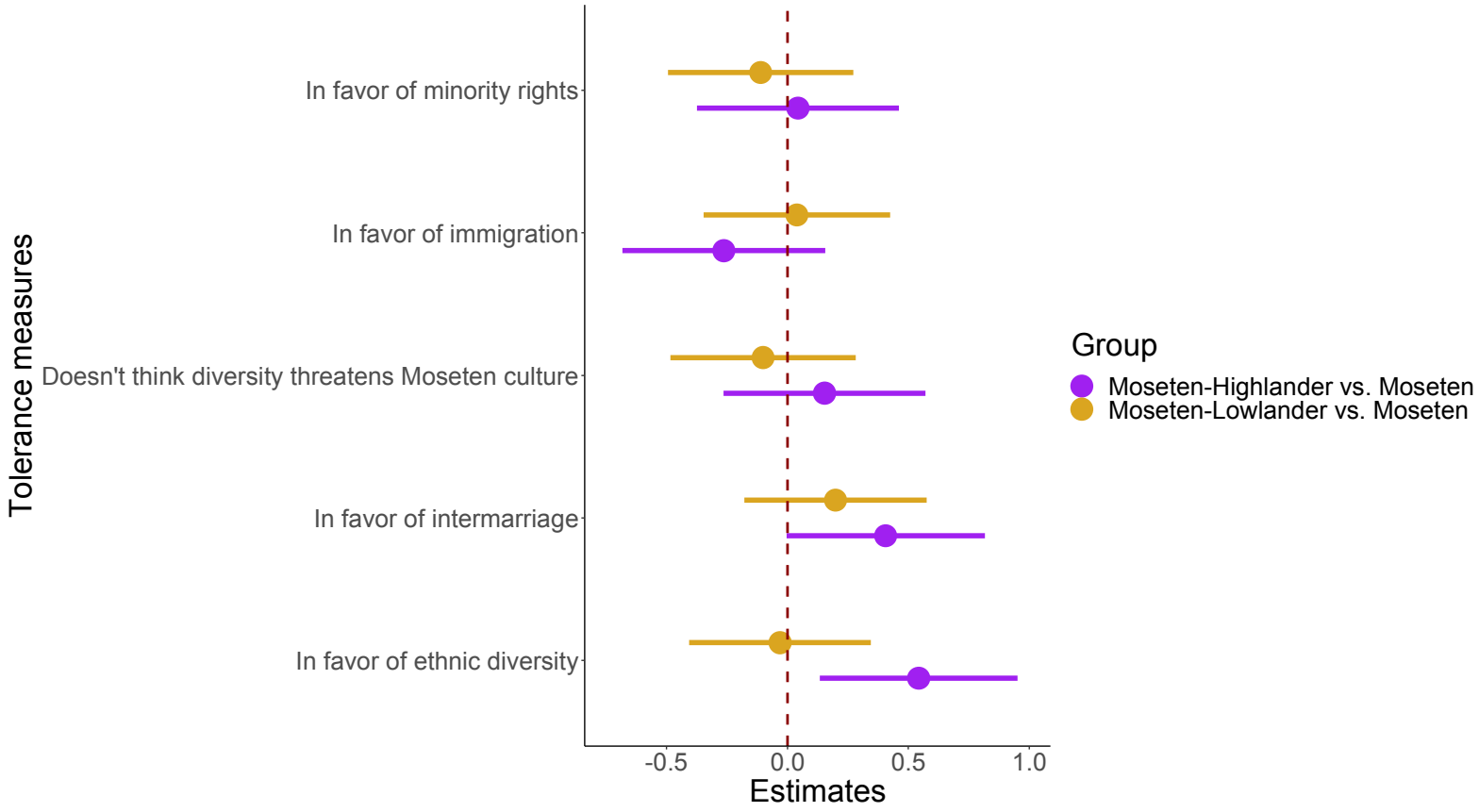

Figure 10. Tolerance of ethnic diversity and number of ties with intermarried Moseten and Moseten of mixed origins for ethnic Moseten. Estimates from model adjusting for gender, age, whether of mixed ethnic origins, whether currently married and spouse ethnicity, years of schooling and household wealth

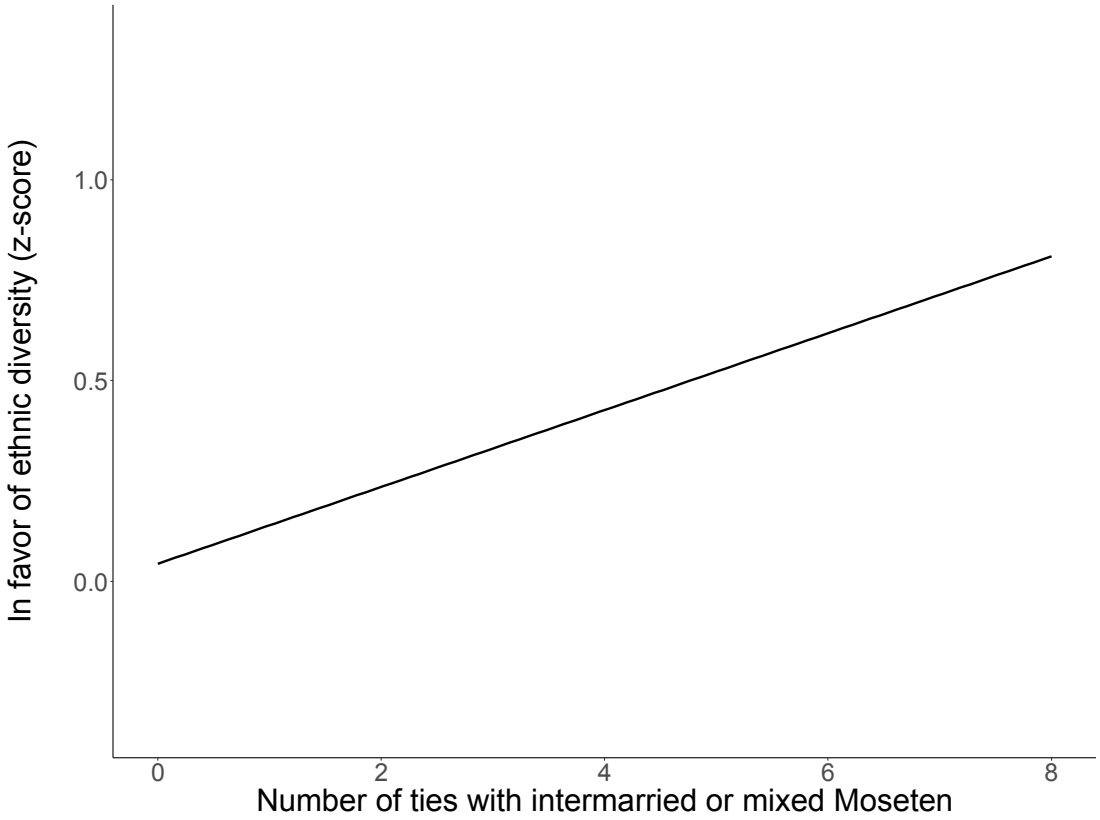

Table 1. Summary statistics for the study community's networks (N=409 residents; 92% interviewed).

ITEM	# Edges	Mean degree	Density	Reciprocity	Transitivity	Diameter	Average path length
1: Finding a job	282	1.38	0.002	0.56	0.10	18	4.57
2: Getting a loan	401	1.94	0.002	0.52	0.19	31	10.3
3: Acquiring arable land	296	1.45	0.002	0.51	0.01	5	1.68
4: Food sharing	355	1.74	0.002	0.88	0.17	6	1.47
5: Support during pandemic	224	1.10	0.001	0.65	0.23	15	4.44
6: Childcare	590	2.89	0.004	0.58	0.33	10	2.52
7: *Aine* (undirected)	172	0.84	0.001	1	0.07	15	5.87
8: Close friends (undirected)	806	3.94	0.005	1	0.15	26	8.28
9: Other friends (undirected)	1136	5.56	0.007	1	0.14	12	5.01

Table 2. Means and standard deviations for proxies of tolerance of minority groups (N=244).

Tolerance proxies (range=-2 – 2)	Mean (SD)
In favor of ethnic diversity	1.15 (0.77)
In favor of intermarriage	0.91 (1.28)
Ethnic diversity and miscegenation not threatening to survival of Moseten culture	-0.57 (1.47)
In favor of immigration to the study community and Alto Beni region	-0.35 (1.34)
In favor of greater minority rights in the study community	-1.56 (0.88)

Table 3. Parameter estimates from linear regression models of average degree, eigenvector and betweenness centrality across networks (N=376 across all models).

	CENTRALITY MEASURE B(SE) p-value		
	Degree	**Eigenvector [log]**	**Betweennes [log]**
Intermarried *[baseline: endogamous]*	-2.25(1.92) 0.24	0.003(0.002) 0.11	0.13(0.13) 0.31
Married *[baseline: single]*	2.54 (2.31) <0.001	0.004(0.003) 0.14	1.07(0.15) <0.001
Highlander parents *[baseline: Moseten parents]*	-9.50(1.95) <0.001	-0.008(0.002) <0.01	-0.85(0.13) <0.001
Moseten-Highlander parents *[baseline: Moseten parents]*	-6.18(3.03) 0.04	-0.001(0.003) 0.75	-0.17(0.20) 0.38
Lowlander parents *[baseline: Moseten parents]*	-4.65(2.62) 0.08	-0.006(0.003) 0.02	-0.48(0.17) <0.01
Moseten-Lowlander parents *[baseline: Moseten parents]*	3.05(2.81) 0.28	0.002(0.003) 0.46	-0.21(0.18) 0.30
Age	0.25(0.07) <0.001	0.0002(0.000) <0.01	0.02(0.004) <0.001
Man *[vs. woman]*	0.54(1.65) 0.75	0.004(0.002) 0.83	-0.03(0.11) 0.80
Years of schooling	0.04(0.23) 0.87	-0.0003(0.000) 0.25	0.002(0.02) 0.92
Household wealth [log]	0.18(0.32) 0.58	0.0001(0.000) 0.73	0.02(0.02) 0.34
Number of consanguineal kin	1.15(0.16) <0.001	0.001(0.000) <0.001	0.06(0.01) <0.001
Number of affinal kin	1.37(0.29) <0.001	0.001(0.000) <0.01	0.07(0.02) <0.001

Table 4. Parameter estimates from logistic regression models of patterns of ethnic self-identification (N=376).

	OR(SE) p-value	
	Identifies with higher-order identity	**Identifies as Moseten**
Marriage		
Intermarried [vs. endogamous]	1.09(1.33) 0.75	0.91(1.36) 0.76
Married [vs. single]	1.21(1.45) 0.61	0.54(1.48) 0.12
Parent's ethnicity	***Baseline = Moseten***	***Baseline = Lowlander***
Moseten	-	4.80(1.50) <0.001
Highlander	3.38(1.34) <0.001	0.37(1.58) 0.03
Moseten-Highlander	2.96(1.57) 0.02	1.64(1.77) 0.39
Lowlander	1.32(1.46) 0.46	-
Moseten-Lowlander	0.42(1.70) 0.10	1.98(1.90) <0.001
Control variables		
Age	0.97(1.01) <0.01	1.03(1.01) <0.01
Man [vs. woman]	1.05(1.28) 0.83	1.13(1.30) 0.63
Years of schooling	0.99(1.03) 0.87	1.00(1.04) 0.99
log (Wealth +1)	0.92(1.05) 0.12	1.11(1.05) 0.05

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5. CONCLUSION

This dissertation has sought to examine the drivers and consequences of intermarriage using an evolutionary framework. Widespread intermarriage is primarily understood as a by-product of successful minority integration and fading group boundaries in contemporary industrialized and globalized societies. However, humans have a much longer history of marriage between individuals from different cultural backgrounds, with important repercussions for the flow of genes and cultural exchange in both past and present human populations (Bentley et al., 2009; Johnson et al., 2014; Mills, 2018; Nielsen et al., 2017; Pakendorf et al., 2003). Drawing on existing theory from human behavioral ecology, evolutionary psychology, social and cultural anthropology, sociology and behavioral economics, I suggest that individual preferences and social norms tolerating or favoring intermarriage are driven by strategic motives to expand and diversify kinship networks. Using data collected in a multiethnic village located at the intersection of the Bolivian Andes and Amazon, this dissertation has focused on two strategic socioeconomic motivations underlying intermarriage between native Moseten and migrants from the highlands and lowlands of Bolivia: access to resources associated with group identity, and risk-buffering in the advent of exogenous shocks to production. Furthermore, I explored how the presence of intermarried couples and their progeny, being of mixed ethnicity, affects social networks, attitudes

towards diversity, and the development of higher-order identities. Results of the most significant findings presented in this dissertation are summarized below.

First, I examined whether intermarriage in the study community was associated more with resource exchange or assortative matching along dimensions such as education. I found significant homophily by ethnicity in marriage partners, despite minimal structural barriers to intermarriage and widespread intermarriage (50.3% of married couples in the study community). Intermarried couples have a higher risk of divorce, suggesting that marrying outside of one's ethnic group may involve important trade-offs. A major finding in this chapter was that benefits of intermarriage might come in the form of socioeconomic resource exchanges between spouses of different ethnicities, notably access to land and civic rights for Highlander and Lowlander men, and access to greater material wealth and possibly better living conditions for Moseten women. However, while Moseten women may leverage their privileged access to land and political representation to marry wealthier men from other groups, intermarriage may constitute a fallback strategy for Moseten men who may experience a marriage squeeze as a result of high rates of male-biased migration from the Highlands to the region of study.

Second, I leveraged a localized crop failure event to investigate whether prior intermarriage between members of different ethnic groups in the study community helped buffer risk. Although buffering resource shortfalls is a primary function of community exogamy according to the anthropological literature (Kelly, 1995; Lee, 1984; Wiessner, 2002), this hypothesis had never been applied to intermarriage in multicultural societies. I found that intermarried Moseten-Highlander (but not

Moseten-Lowlander) couples tend to show evidence of better resilience in the face of an exogenous shock, in this case a papaya disease that wiped out a major cash crop in 2016-2017. Relative to ethnically endogamous Moseten couples, Moseten-Highlander couples incurred smaller relative income losses and recovered a significantly greater percentage of income lost by 2021. This greater resilience is due in part to accessing broader social support networks, notably relatives and friends outside the study community who were not exposed to the same shock, and thus were able to provide financial support. However, intermarried Moseten-Highlander couples were not found to be more or less resilient than endogamous Highlander couples, suggesting intermarriage may only result in greater risk buffering for Moseten marrying Highlanders, but not Highlanders marrying Moseten. Nevertheless, these findings suggest that in a context characterized by unpredictability and variability in production, intermarriage may lead to reduced susceptibility and greater resilience to exogenous shocks to production if occupations, economic portfolios and social networks vary between groups. Although a greater ability to buffer risk may be an unintended consequence of intermarriage, the potentially greater material success of intermarried couples in ecologies characterized by greater environmental unpredictability, may result in more favorable attitudes and norms towards intermarriage.

Finally, I explored pathways by which intermarriage may lead to greater minority integration and social cohesion. In particular, I examined how the presence of intermarried couples and their multiethnic progeny affects social networks, attitudes towards diversity, and the development of higher-order identities. I found

intermarried individuals act as bridges that connect the different ethnic groups within the community. Children of intermarriage, however, were not found to bridge ties across ethnic clusters. Instead, they appear to associate preferentially with individuals from the Moseten majority. Both intermarried individuals and their progeny were found to have more social ties outside the study community – many of which are unrelated friends – suggesting intermarriage may lead to greater integration into the broader Bolivian society. Intermarried Moseten individuals, those of mixed ethnicity, and Moseten who share more social ties with them tend hold more favorable attitudes towards the general concept of ethnic diversity. Surprisingly, however, they are not more or less in favor of immigration to the region or improved minority rights within the study community relative to ethnically endogamous Moseten, fully ethnic Moseten, and Moseten who share fewer ties with intermarried individuals and those of mixed ethnicity. Individuals of mixed Moseten-Highlander descent and fully ethnic Highlanders are both more likely to espouse a superordinate non-ethnic identity. Individuals of mixed Moseten-Lowlander descent, on the other hand, are more likely to identify as Moseten, perhaps due to cultural proximity and a longer history of intermarriage between the two groups. Taken together, these findings suggest intermarried intermarriage may help bridge ties across groups, facilitate or accelerate the integration of indigenous peoples into national society, and result in more cosmopolitan attitudes in future generations. However, intermarriage does not necessarily lead to more progressive attitudes towards immigration and minority rights at the local level.

Considering all the above, this dissertation suggests that resource exchange and risk buffering may, at least in part, drive intermarriage in multicultural societies where resource access, production strategies and social networks vary between groups. Accordingly, intermarriage may be widespread even in contexts where markers of group identity, such as ethnicity, remain important factors in the choice of marriage partners. Suggesting individuals strategically intermarry to adjust their resource portfolios for their own economic betterment (and potentially that of the next generation) is not an alternative, but rather a complementary explanation to assortative matching theories of intermarriage (i.e., intermarriage as a by-product of homophily by characteristics other than ethnicity). For instance, socioeconomic and educational homogamy may offset the greater risk of marital conflict encountered by intermarried couples, but concurrently reflect heightened competition for economic resources on the marriage market that incentivizes marrying out. Sociologists and behavioral economists have found that small ingroup size and imbalanced sex ratios are important socioecological correlates of widespread intermarriage (Davin, 2007; Harris & Ono, 2005; Leinonen & Gabaccia, 2014; Mishra, 2013). Drawing on insights from the human behavioral ecology and behavioral economics literatures on community exogamy (e.g., Dow et al., 2016; Lee, 1984; Rosenzweig, 1989; Wiessner, 2002), I contributed to this body of research by suggesting widespread intermarriage may also be correlated with conditions of greater ecological unpredictability and variability in production. However, while mate scarcity resulting from small ingroup size and/or imbalanced sex ratios can lead to the abrupt adoption of norms favoring intermarriage as a fallback strategy (Namari, 2013;

Sherwood, 2013), the potential advantage intermarriage confers by buffering risk under conditions of greater ecological uncertainty may lead to a more organic (and perhaps more stable over time) endorsement of norms favoring intermarriage.

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APPENDIX A: DOES RESOURCE ACCESS DRIVE INTERETHNIC MARRIAGE? A TEST OF EXCHANGE THEORY IN RURAL BOLIVIA

Figure 1. Survival probability of ethnically endogamous and ethnically exogamous unions for different ethnic combinations

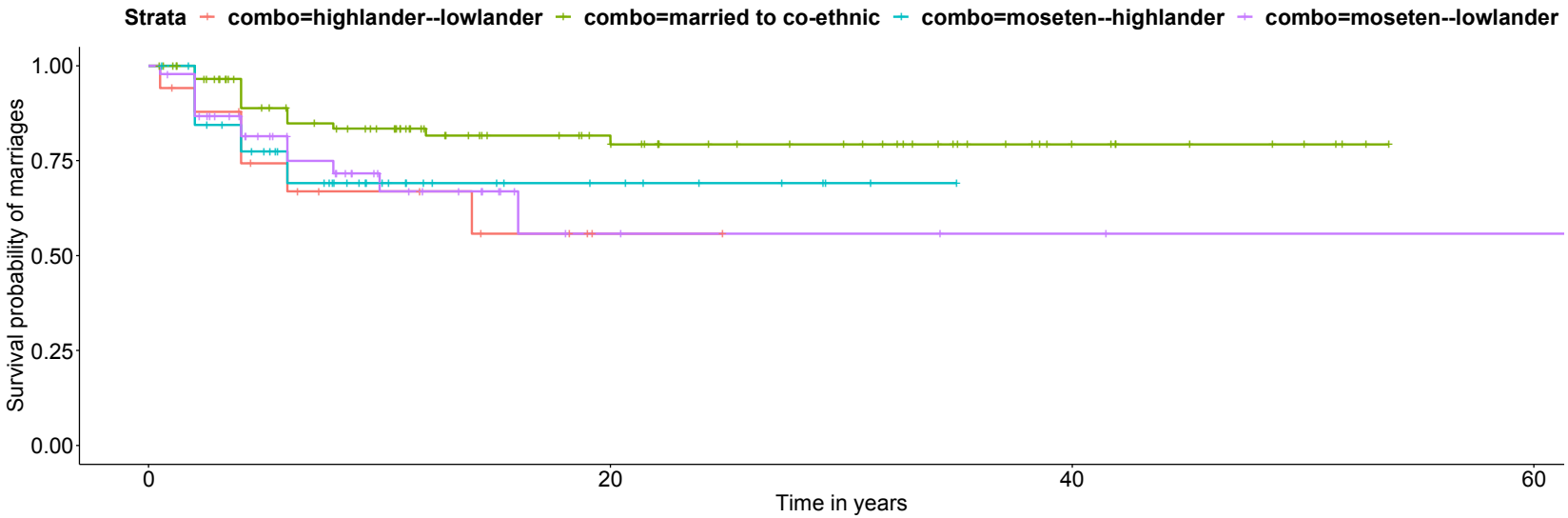

Table 1. Linear regression model of predicted average number of hectares of land in TCO Moseten allocated to Highlander and Lowlanders married to co-ethnics vs. Moseten (N=107).

	B	SE	p-value
Married to Moseten (0-1)	2.60	1.32	0.05
Age	-0.09	1.26	0.94
Man *[vs. woman]*	-0.09	1.26	0.94
Years living in community	2.16	2.03	0.30
Household wealth [log]	4.13	0.91	<0.001

Table 2. Linear regression model of predicted age difference between Highlander and Lowlanders men and their wives (N=77).

	B	SE	p-value
Husband's age * Moseten wife (0-1)	0.19	0.10	0.07
Moseten wife (0-1)	-6.90	4.26	1.11
Husband's age	0.03	0.07	0.70
Husband's years of schooling	-0.32	0.16	0.06

APPENDIX B. INTERMARRIAGE IMPROVES ECONOMIC RECOVERY FROM EXOGENOUS AGRICULTURAL SHOCK

Table 1. Estimates from linear regression model of household income diversity in 2021 measured by the Simpson diversity index (N=155 couples)

	Estimate	**SE**	**p-value**
Spouses' ethnicities [baseline: Moseten – Moseten couple]			
Moseten-Highlander couple	0.07	0.03	0.02
Moseten-Lowlander couple	0.01	0.03	0.82
Highlander-Highlander couple	0.04	0.03	0.19
Wife's age	-0.00	0.00	0.29
Husband's age	0.00	0.00	0.73
Wife's years of schooling	-0.01	0.00	0.02
Husband's years of schooling	0.00	0.00	0.83

Table 2. Estimates from linear regression model of number of social ties within the community (N=155 couples)

	Estimate	**SE**	**p-value**
Spouses' ethnicities *[baseline: Moseten – Moseten couple]*			
Moseten-Highlander couple	1.87	0.93	0.05
Moseten-Lowlander couple	0.27	0.88	0.76
Highlander-Highlander couple	-0.14	0.87	0.87
Wife's age	0.01	0.06	0.54
Husband's age	-0.04	0.07	0.54
Wife's years of schooling	0.09	0.11	0.42
Husband's years of schooling	-0.05	0.10	0.63
Household income in 2021 [log]	-1.06	0.51	0.04

Table 3. Estimates from linear regression model of number of social ties outside the community (N=155 couples)

	Estimate	SE	p-value
Spouses' ethnicities *[baseline: Moseten – Moseten couple]*			
Moseten-Highlander couple	7.93	1.40	<0.001
Moseten-Lowlander couple	1.51	1.32	0.26
Highlander-Highlander couple	3.71	1.31	<0.01
Wife's age	0.09	0.09	0.33
Husband's age	-0.16	0.10	0.12
Wife's years of schooling	0.07	0.17	0.96
Husband's years of schooling	0.01	0.15	0.96
Household income in 2021 [log]	-0.43	0.77	0.57

Table 4. Estimates from linear regression models of percentage of 2015 income recovered by 2021 (N=96)

	B(SE) p-value			
	(1)	**(2)**	**(3)**	**(4)**
Moseten-Highlander	40.65 (19.21) 0.04	22.27 (18.08) 0.22	20.52(17.69) 0.25	14.86(17.40) 0.40
Moseten-Lowlander	5.10 (16.66) 0.76	-1.22 (15.30) 0.94	7.41(14.90) 0.62	2.94(14.64) 0.84
Highlander-Highlander	10.48 (16.65) 0.53	-7.55 (15.80) 0.63	-13.45(15.71) 0.39	-17.86(15.43) 0.25
Received remittances		63.37 (14.94) <0.001		38.43(16.37) 0.02
# Ties outside the village			4.98(1.05) <0.001	3.63(1.17) <0.01
Wife's age	-0.32 (1.20) 0.79	-0.66 (1.10) 0.54	-0.73(1.07) 0.49	-0.82(1.05) 0.43
Husband's age	-0.19 (1.23) 0.88	0.46 (1.14) 0.68	0.59(1.11) 0.60	0.77(1.09) 0.48
Wife's years of schooling	0.43 (1.99) 0.83	1.46 (1.84) 0.42	1.24(1.79) 0.49	1.65(1.75) 0.35
Husband's years of schooling	1.46 (1.88) 0.44	1.06 (1.72) 0.54	0.65(1.69) 0.69	0.63(1.64) 0.70
Household income in 2021[log]	-17.82 (10.23) 0.09	-9.78 (9.54) 0.30	-14.70(9.17) 0.11	-10.67(9.10) 0.24
% Income from papaya in 2015	0.02 (0.27) 0.94	0.13 (0.25) 0.61	0.06(0.24) 0.80	0.11(0.24) 0.63
AIC	1052.25	1035.82	1031.59	1027.50

APPENDIX C: DOES INTERMARRIAGE IMPROVE MINORITY INTEGRATION AND SOCIAL COHESION?

Table 1. Estimates from models of bridge betweenness centrality (N=376)

	B(SE) p-value	
	(1)	**(2)**
Intermarried	0.41 (0.13) <0.01	0.28 (0.12)
Man [vs. woman]	-0.19 (0.11) 0.09	-0.07(0.11) 0.48
Age	0.02 (0.00) <0.000	0.02(0.00) <0.001
Highlander [vs. Moseten]	-0.84 (0.13) <0.001	-0.80 (0.12) <0.001
Moseten-Highlander [vs. Moseten	0.11 (0.20) 0.58	-0.08 (0.19) 0.69
Lowlander [vs. Moseten]	-0.66 (0.17) <0.001	-0.49 (0.17) <0.01
Moseten-Lowlander [vs. Moseten	-0.21 (0.19) 0.27	-0.14 (0.18) 0.42
Married [vs. single]	0.85 (0.16) <0.001	0.86 (0.15) 0.61
Years of schooling	0.03 (0.02) 0.03	0.01 (0.01) <0.001
Household wealth [log]	0.03 (0.02) 0.23	0.02 (0.02) 0.30
Number of consanguineal kin		0.06 (0.01) <0.001
Number of affinal kin		0.06(0.02) <0.01
AIC	1060.23	995.84