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## “United in diversity”: The interplay of social network characteristics and personality in predicting outgroup attitudes

Magdalena Bobowik,<sup>1,2</sup>  Verónica Benet-Martínez<sup>1,3</sup> and Lydia Repke<sup>4</sup> 

### Abstract

Diversity in social relations is important for reducing prejudice. Yet, the question of when this occurs remains open. Using a social network approach, we test whether the link between outgroup attitudes and number of intra- and intergroup contacts is moderated by type of relationship (strong vs. weak ties) and personality (openness to experience) while also considering network structure (connections between contacts). In a culturally diverse sample of 122 immigrants residing in Barcelona, positive outgroup attitudes were predicted by several network characteristics: low proportion of intragroup contacts and high proportion of intergroup contacts among strong ties, high ethnic diversity among strong ties, low connectedness among contacts in the country of origin, and high connectedness between coethnic local and host national contacts. Openness to experience moderated these effects. These results affirm the intergroup benefits of having compositionally and structurally diverse networks, and the gain in examining intergroup dynamics at the meso level of analysis.

### Keywords

immigration, intergroup contact, openness to experience, outgroup attitudes, personal social networks

In most multicultural societies today, intercultural interactions are a common and often unavoidable experience. Interculturalism has also become a prominent new ideology to manage cultural diversity (Meer & Modood, 2012). Whereas multicultural policies aim to give visibility to “traditional” cultures, interculturalist ones celebrate hybridity as a generator of culture (i.e., new broader cultures representing unity and fusion in

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diversity). Interculturalism recognizes individuals as culturally complex and malleable and seeks to promote dialogue through the positive interaction of culturally different individuals and groups (Morris et al., 2015). Yet despite growing globalization and opportunities for intercultural encounters, the segregation of immigrant communities persists as a challenge in contemporary societies (Stoll & Wong, 2007).

The role of contact between members of different social groups in fostering positive intergroup dynamics is well demonstrated in social psychology (Pettigrew & Tropp, 2006). Within this field, some studies have adopted social network analysis, which maps onto actual contact between individuals (Borgatti et al., 2009), and revealed that network characteristics are linked to intergroup appraisals among both majority and minority groups (Munniksma et al., 2013; Stark, 2020; Wölfer et al., 2017). Yet this research has been limited to testing the relevance of close intergroup relationships, such as friendships, for outgroup attitudes. In the current study, we test the idea that the type of relationship moderates the link between contact and attitudes, and we consider close (i.e., strong ties) and more distant interactions (i.e., weak ties) in tandem. In line with existing contact (e.g., Davies et al., 2011) and social network research (Centola & Macy, 2007; Reagans & McEvily, 2003), we propose that close intergroup relationships (e.g., friendships), which are characterized by high relational embeddedness,<sup>1</sup> have the potential to shape evaluations of outgroup members because they increase trust, which in turn facilitates the ease of transferring complex and tacit knowledge. In contrast, from this perspective, more distant relations (e.g., casual interactions with neighbors) would be less relevant for outgroup attitudes.

In addition, earlier research has largely focused on networks' content-related features (e.g., the number of reciprocal outgroup friends or the number of outgroup friends of one's ingroup friends; Munniksma et al., 2013; Wölfer et al., 2017). Less is known about the role of structural embeddedness—that is, the “configuration of linkages between people” (see Nahapiet & Ghoshal, 1998, p. 244)—in intergroup relations. Extending previous research, we examine the role intergroup connectedness (the number of connections between social contacts of different ethnicity) and intragroup connectedness (the number of connections among same-ethnicity contacts) have in outgroup attitudes.

Finally, there is evidence that individual dispositions such as personality may intensify or attenuate the nexus between sociorelational cues and prejudice (Duckitt & Sibley, 2009, 2010). For instance, openness to experience makes a person more likely to seek out experiences with unfamiliar others, and thus more favorable towards outgroups when experiencing intergroup contact (Danckert et al., 2017). This previous research, however, involved only majority group members, relied on explicit self-report measures of intergroup contact or exposure (e.g., asking “How many refugees or immigrants live in your neighborhood?”; response options: *none*, *few*, *some*, and *many*), and did not differentiate between closer and more distant relationships.

With the aforementioned considerations in mind, in the present study, we examine in a culturally diverse immigrant community sample whether the content of their personal social networks (i.e., the proportion of relationships with individuals of the same and different ethnicities as well as ethnic diversity, that is, the probability that two members of the network are from two different ethnic groups) and the structure of these networks (i.e., the number of connections between network members of the same or different ethnicity) predict attitudes towards ethnically diverse others. We also examine two possible moderators of the nexus between social network features and intergroup attitudes: relationship type and personality (openness to experience).

### **Contact and Outgroup Attitudes: A Minority's Perspective**

According to contact theory (Allport, 1954), intergroup interaction under appropriate conditions can effectively reduce prejudice between majority and minority group members. Broadly

demonstrated to foster positive intergroup attitudes (Pettigrew & Tropp, 2006), intergroup contact has been studied predominantly among majority groups (Dovidio et al., 2017). Among minorities, contact can deactivate stereotype threat (Abrams et al., 2006) and promote favorable outgroup evaluations (Gómez et al., 2011; González et al., 2010; Hayward et al., 2017; Vezzali et al., 2010, 2017). Still, compared to members of majority groups, the link between contact and prejudice is usually weaker among members of minority groups (Barlow et al., 2013; Binder et al., 2009; Lemmer & Wagner, 2015; Tropp & Pettigrew, 2005). Perhaps this is the case because the latter are less convinced that optimal conditions of contact have been met (Robinson & Preston, 1976), or because feeling devaluated as a group inhibits the positive effects of contact (Tropp & Pettigrew, 2005). This minority–majority gap remains an open problem in the area, which is why there is a pressing need to identify aspects of contact that contribute to more positive outgroup attitudes among minority group members, including immigrants.

Further, although the contact literature has hardly considered both intergroup and intragroup interactions simultaneously (Dovidio et al., 2017), acculturation scholars have made a distinction between coethnic (ingroup) and host (outgroup) social support networks (see Jasinskaja-Lahti et al., 2006). They have suggested that relationships with outgroup members may be more beneficial for immigrants than coethnic support networks (e.g., Birman et al., 2002). Thus, the weight of intergroup and intragroup interactions for immigrants' outgroup attitudes may be distinct. Given the unequal power distribution between majority and minority groups, the costs of cultivating mostly intragroup relations might be higher for the latter group. Confirming this, Levin et al. (2003) found a negative relationship between ethnic minorities' number of ingroup and outgroup friends, in that having more outgroup friends decreased intergroup bias (intergroup bias defined as more favorable attitudes towards the ingroup relative to outgroups), whereas having more ingroup friends increased it. In line with this distinction and following Repke and Benet-Martínez (2017), we differentiate between intra- and intergroup contacts in a network, and test their role in shaping immigrants' outgroup attitudes.

## **Beyond Individual-Level Processes: A Social Network Perspective**

Structural- and individual-level processes inherently coexist and jointly define social communities (Repke & Benet-Martínez, 2019; Robins & Kashima, 2008). Furthermore, contact between individuals occurs in large and complex social settings (Pettigrew et al., 2007, 2011; Postmes et al., 2015). In this context, social network techniques constitute a more implicit approach to measuring intergroup contact than traditional self-reports (Molina et al., 2014; Wölfer et al., 2015; Wölfer & Hewstone, 2017). Social network methods reveal the meso-level characteristics of social relationships by describing network structure (Repke & Benet-Martínez, 2019; Wölfer et al., 2015; Wölfer & Hewstone, 2017), which might shape outgroup attitudes in ways not readily observable to actors and naïve observers. However, the link between contact networks and outgroup attitudes may depend not only on who is part of a network (e.g., ingroup vs. outgroup members) but also on the amount of cohesion (i.e., relational and structural embeddedness) among all contacts in one's network.

### *Relational Embeddedness and Outgroup Attitudes*

Network composition data, such as the number of ingroup and outgroup contacts in one's network, may be predictive of outgroup evaluations and intentions. Confirming this, a couple of studies found an association between social network composition, such as the number of direct and extended intergroup friendships, and favorable outgroup attitudes (Munniksma et al., 2013; Stark, 2020; Wölfer et al., 2016, 2017). Social diversity—that is, the probability that two randomly selected individuals

in a unit belong to two different groups (see Alesina et al., 2003; Fearon, 2003)—is another interesting network content attribute. The relationship between diversity and prejudice or intergroup trust is not straightforward and may even be negative (Koopmans & Veit, 2014; Steele & Abdelaaty, 2019). Nevertheless, a couple of studies have found that neighborhood ethnic diversity may be linked indirectly to less prejudice (Schmid et al., 2013, 2014). Finally, studies including minority groups found that those who lived in more ethnically homogenous neighborhoods displayed more negative outgroup evaluations and that their negative stereotypes about other ethnic groups diminished as the neighborhoods became more ethnically diverse (Oliver & Wong, 2003), suggesting that not only intergroup but also intragroup processes shape the way people respond towards outgroup members.

A remaining question is under what conditions the association between ethnic composition or diversity and outgroup attitudes becomes positive. Given that relationships can differ qualitatively (e.g., in terms of intimacy and emotional intensity), some social contacts may be more relevant for outgroup attitudes than others, that is, imply higher relational embeddedness. The contact literature suggests that close social relationships, such as friendships and family connections, may condition our worldview, including perceptions of minority groups (Davies et al., 2011; Huijnk et al., 2013; Paterson et al., 2015; Tropp & Pettigrew, 2005), and thus be particularly effective in reducing prejudice (Davies et al., 2011) as compared to more casual forms of contact (Pettigrew & Tropp, 2006).

Consistent with this rationale, social network scholars posit that the spread of costly, controversial, or private behavior (e.g., a decrease in prejudice) within a community is more likely to happen in networks with a lot of redundant (and usually strong) relationships, which make repeated contact with the same type of information more likely (Centola & Macy, 2007; Granovetter, 1983; Reagans & McEvily, 2003), in addition to creating a more trustworthy environment. In contrast, weaker ties, which typically involve less repeated and less meaningful contact, would not have the necessary potential to change such costly attitudes or behaviors. In line with this, some research has shown that casual residential intergroup encounters (i.e., weak ties) are unrelated to outgroup attitudes or even generate hostile outgroup reactions (Hainmueller & Hopkins, 2014). In the present work, we analyze weak and strong relationships simultaneously and account for both intergroup and intragroup contact. Further, in line with existing literature, we expect the proportion of strong intragroup relationships to be negatively (H1), whereas the proportion of strong intergroup contacts (H2) and ethnic diversity among strong relationships (H3) to be positively, associated with immigrants' outgroup attitudes, while we expect respective weaker relationships to be unrelated to outgroup evaluations.

### *Structural Embeddedness and Outgroup Attitudes*

Network structure properties provide an insight into the architecture of social relationships (i.e., structural embeddedness; Nahapiet & Ghoshal, 1998). In this research, we calculate the amount of connectedness, defined as the number of existing ties among contacts (or alters) in the social network. This measure differs from traditional density indices (Wasserman & Faust, 1994) in that it is adjusted for the network (or group) size instead of the number of all possible ties (Repke & Benet-Martínez, 2018), which makes it more adequate to reflect structural cohesion of/between different ethnocultural groups, usually of different size relative to each other. We further distinguish intragroup (the number of connections among same-ethnicity contacts) and inter-group connectedness (the number of connections between different-ethnicity contacts).

Research shows that ethnically diverse but segregated communities experience increases in prejudice, whereas those that are both diverse and integrated show stable or even improving intergroup relations (Laurence et al., 2019). Thus, intergroup connectedness in social networks, as a

structural reflection of interculturalism (Morris et al., 2015), may be crucial in promoting positive outgroup attitudes, in line with research examining subjective or perceived connectedness with the host society members (Cao et al., 2018; van Bergen et al., 2015). In contrast, the amount of intragroup connectedness in a network, as a (relatively) less biased and structural manifestation of ingroup attachment, is expected to negatively predict positive intergroup dynamics (van Bergen et al., 2015). We thus predict intragroup connectedness (i.e., the number of ties among coethnic contacts in the network) to be negatively (H4) related to outgroup attitudes, and we expect intergroup connectedness (i.e., amount of cross-ethnic ties) to be positively (H5) related to out-group attitudes.<sup>2</sup>

### **The Role of Openness to Experience**

A comprehensive account of intergroup dynamics should include not only the contextual characteristics that might activate or mitigate prejudice but also the dispositions that individuals bring to these contexts. According to the dual-process motivational model of ideology (Duckitt & Sibley, 2009, 2010), situational cues such as interactions with members of unfamiliar social groups may be stronger triggers of prejudice among people with certain individual characteristics. Accordingly, research has shown that a higher proportion of immigrants in a community is associated with negative attitudes toward immigration for respondents high in dangerous world beliefs (Sibley et al., 2013), while ethnic diversity predicts positive outgroup attitudes among people low on authoritarianism (Assche et al., 2014). However, some studies have found the reverse moderating mechanism, where contact was linked with less prejudice among people high on right-wing authoritarianism (Asbrock et al., 2012; Dhont & van Hiel, 2009; Hodson, 2008; Hodson et al., 2009), perhaps because, for them, contact attenuates the perception of the outgroup as dangerous for social cohesion and order.

Similar processes may occur with certain personality factors. Openness to experience—which reflects the breadth, depth, and permeability of boundaries in consciousness and experience (McCrae & Costa, 1997)—is a reliable predictor of outgroup attitudes (Duckitt & Sibley, 2010; Ekehammar & Akrami, 2003; Jackson & Poulsen, 2005; Sibley & Duckitt, 2008). People high in openness are more dispositionally prepared to experience novelty and variety (i.e., show broad interests and appreciate new ideas and ways of life) and are more motivated to seek new and unfamiliar experiences. Due to their need for diverse experience, open-minded people might be more likely to get involved in interactions with individuals who are different from them, and might also respond more positively to social differences (Danckert et al., 2017). In contrast, close-minded individuals might feel threatened by the presence of outgroup members and thus react more negatively (Duckitt & Sibley, 2010). Research has indicated that highly open individuals are more receptive to stereotype-disconfirming information about a minority group (Flynn, 2005), and express more proimmigration attitudes when experiencing intergroup contact or exposure to ethnic diversity (Danckert et al., 2017). The present study will shed additional light on these processes by examining the role of openness in the association between personal network characteristics and outgroup attitudes. We predict that openness to experience will moderate the link between social network variables and outgroup attitudes (H6).

### **Current Research and Study Context**

Taking a minority perspective through a meso-level lens on intergroup contact, the present research examines whether the social networks of immigrants are predictive of their outgroup attitudes. We focus on both the composition (i.e., the proportion of intra- and intergroup contacts and ethnic diversity among strong ties) and structure (i.e., intra- and intergroup connectedness) of their networks, and derive predictions for how

these variables may associate with outgroup attitudes. Rather than defining our outcome variable exclusively in terms of attitudes towards the dominant cultural group (i.e., host nationals), we take a broader perspective and focus on attitudes towards ethnically diverse outgroup members. This choice was motivated by (a) a desire to minimize any possible conceptual redundancy between network compositional variables capturing relations with host society's members and self-reported attitudes towards this particular group, and (b) our reasoning that the benefits of having personal social networks characterized by compositional and structural diversity are general and relate to ethnically diverse others—that is, broadly defined ethnocultural outgroups (Tadmor et al., 2012).

We focus on the personal social networks of immigrants. Because migration to a new country often brings the expectation of establishing new relationships while leaving behind old ones, migration represents a unique case of both intra- and intergroup dynamics and pressures which are often reflected in the social networks that immigrants encounter, create, and sustain (Bilecen et al., 2018). This study was carried out in Spain, a country with a foreign-born population of around 6 million, making it the sixth most popular migrant destination in Europe in 2019 and the 11th top destination country in the world for international migrants (International Organization for Migration, 2020). For our study, we selected four immigrant groups (Ecuadorians, Moroccans, Pakistanis, and Romanians) based on four criteria: (a) group size in the province of Barcelona (and in Spain), (b) worldwide geographic representativeness (Africa, Asia, Europe, and Latin America), (c) religious representativeness (two main religions: Christianity and Islam), and (d) language (Romance and Indo-Arabic; for further details on these groups' characteristics, see Repke & Benet-Martínez, 2018). The data collected for this study were correlational, yet it involved a two-stage process. Participants were first recruited to provide network data in addition to some self-report measures (see Repke & Benet-Martínez, 2018) and 2 years later, they answered other measures, including outgroup attitudes.

## Method

### *Participants*

We recruited a community sample of 122 adults with an immigrant background who lived in the metropolitan area of Barcelona. Females made up 59% of the sample, and the mean age of participants was 33.05 years ( $SD = 10.33$ , range: 19 to 64). The majority of respondents were foreign-born (92.6%), and 7.4% were second-generation migrants (born in Spain with at least one parent born outside of Spain). Foreign-born participants' average length of residence in Spain was 10 years ( $SD = 4.84$ ), most of them having resided in Catalonia from the beginning ( $M = 9.53$ ,  $SD = 3.73$ ). Participants (or at least one of their parents) were born in Ecuador, Morocco, Pakistan, or Romania. All of them had a good working knowledge of one or both host languages (Catalan and Spanish). A quarter of the sample had a family income of  $\leq$  €500 per month (25.5%); 23.8% earned from €501 to €1,000; 26.2% earned from €1,000 to €1,500; and 18.9% had an income higher than €1,500 per month (5.7% did not respond). Every fourth respondent had vocational training (26.2%); a quarter had secondary education (24.6%); 21.3% had incomplete university education; 11.5% had a university degree; 9% had postgraduate studies; and 7.4% had primary or no formal education.

### *Procedure*

Participants were recruited through relevant cultural, religious, and immigrant-related organizations in Barcelona.<sup>3</sup> The data were collected in two stages. First, a wider community sample of participants was invited to provide social network data in addition to some self-report measures (see Repke & Benet-Martínez, 2018). Data collection took place in individual or small group sessions in the assisting organizations' premises or the university laboratory.<sup>4</sup> Each participant received a €15 voucher for participation in the study. In the second stage (2 years later), all participants were recontacted by telephone, e-mail, and online social communities to participate in a second

study involving a Qualtrics-based questionnaire where outgroup attitudes questions were registered among other measures.<sup>5</sup> Each participant received monetary compensation (€15) for their participation in the second study. All respondents participated in a raffle to win €150. All measurement tools were first developed in English and then translated into Spanish and Catalan by a qualified bilingual translator. Participants were able to choose between the two host languages.

## *Measures*

*Social networks.* To collect ego network data, we used EgoNet, a software program developed for collecting, analyzing, and visualizing personal social network data (McCarty, 2003). Each participant (ego) was given the following instructions:

Please provide the names of 25 persons you know (of any culture or ethnicity), with whom you have had regular contact in the past 2 years, either face-to-face, by phone, mail, or e-mail, and whom you could still contact if you had to.

To help respondents think of diverse life domains and access different “storage rooms” in their memory, we provided a visual aid card showing distinct relationship spheres (i.e., family, friendship, romantic relationship, neighborhood, education/work, and religion). Participants then provided information about each alter’s ethnicity/culture, place of birth and residence, type of relationship, and language used between them (ego) and alter. In the last step, participants (egos) indicated for each possible pair of alters whether they knew each other. From these data, we constructed the variables measuring network composition and structure (for discussion of a similar methodology, see Repke & Benet-Martínez, 2017, 2018, 2019).

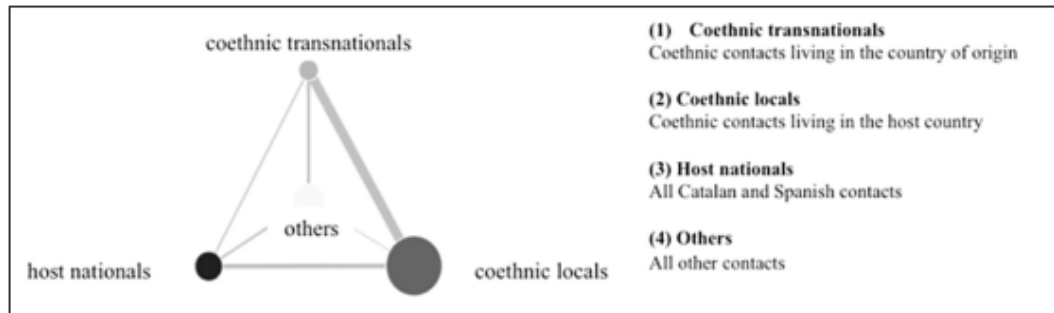
*Proportion of intra- and intergroup contacts among strong and weak ties.* The network composition variables used in this study were the proportions of intragroup contacts (i.e., number of same-ethnicity contacts both in the host country and in the country of origin) and intergroup contacts (i.e., number of host national—Catalan and Spanish—contacts) differentiated by relationship type. We categorized friends, romantic partners, and immediate and extended family members as strong ties, whereas work colleagues/school peers, neighbors, acquaintances, and others were labeled as weak ties.<sup>6</sup> Based on this categorization and on ethnicity, we constructed four variables. Using only strong ties, we calculated the proportion of intragroup and intergroup contacts within each participant’s (ego’s) network. We also computed the proportion of intragroup and intergroup contacts considering only alters categorized as weak ties.

*Ethnic diversity among strong and weak ties.* Taking into account three cultural groups (same-ethnicity contacts, host nationals, and the remaining group of culturally diverse others), the ethnic diversity index reflects the probability that two randomly selected alters are from two different groups. This variable is based on a commonly used fractionalization measure (e.g., Alesina et al., 2003; Fearon, 2003). We also calculated ethnic diversity for strong and weak ties separately (for exact formulas, see Repke & Benet-Martínez, 2018).

*Intra- and intergroup connectedness.* Intragroup connectedness reflects the number of ties among contacts of the same ethnic/cultural group divided by the number of these contacts (i.e., weighted by group size). Intergroup connectedness was calculated as the number of connections between contacts belonging to two different ethnic/cultural groups weighted by their group sizes (i.e., divided by the geometric mean of the two group sizes; see Brandes et al., 2010). Using the clustered graph method (Brandes et al., 2010), we created four groups of social contacts based on contacts’ ethnicity and place of residence: (a) coethnic transnationals (CT; same-ethnicity alters living in the participant’s country of origin), (b) coethnic locals (CL; same-ethnicity alters living in Catalonia or the rest of Spain), (c) host



**Figure 1.** The four clustered groups.



Note. Adapted from Brandes et al. (2010, Figure 1) and Repke and Benet-Martínez (2018, Figure 1).

nationals (C/S; host national—Catalan and Spanish—alters), and (d) culturally diverse others (see Figure 1). The rationale for splitting same-ethnicity contacts into coethnic locals (i.e., living in the host country) and coethnic transnationals (i.e., living in the country of origin) is that their connections with other cultural groups may differ substantially. In this study, we used all four intragroup connectedness measures: CL, CT, C/S, and others. However, we focused on intergroup connectedness between coethnic locals and the remaining three groups. That is, we used three intergroup connectedness variables: CL–CT, CL–C/S, CL–others (for details on this methodology, see Repke & Benet-Martínez, 2018).

*Connectedness.* We also created an index of overall network connectedness (i.e., the number of existing connections in each ego’s network divided by network size) to adjust for its impact over and above intra-/intergroup connectedness.

*Outgroup and ingroup attitudes.* Participants’ outgroup and ingroup attitudes were measured in terms of their willingness to engage in an interaction with an outgroup/ingroup member. This measure, adapted from Bogardus’s Social Distance Scale (Bogardus, 1925; Goff et al., 2008), included four items concerning an outgroup member (i.e., someone who is not from the participant’s country of origin) and four items referring to an ingroup member (i.e., someone from the participant’s or their parents’ country of origin). Participants were asked on a scale from 0 (not willing at all) to 10 (extremely willing), “To what extent would you be willing to participate in the following activities with someone who is not [ingroup]/with someone who is [ingroup]?” The items listed for both the outgroup and ingroup members were “accept an invitation to their home,” “invite them to my house,” “work together in the same team,” and “have a date with them.” We created indicators of outgroup and ingroup attitudes with four items used to measure each. Both scales reached satisfactory reliability ( $\alpha = .76$  and  $\alpha = .74$ , respectively).

*Openness to experience.* Trait openness to experience (McCrae & John, 1992) was measured with a scale comprising 10 items ( $\alpha = .77$ ). Participants responded on a scale from 0 (strongly disagree) to 4 (strongly agree) to what extent they agreed that a series of expressions described them accurately (e.g., “She/he has very broad interests”).

*Sociodemographic variables.* We also measured participants’ gender (female vs. male), age (in years), income (1 = less than €500 per month, 6 = more than €2,500 per month), length of residence in Spain (in years), and ethnicity.

### Analytical Strategy

We used correlation and regression analyses to test the relationships between social network variables and outgroup attitudes.<sup>7</sup> We conducted hierarchical regression analyses, where we introduced the covariates (gender, age, income, and religious group) in the first step, ingroup attitudes in the second step, and social network

variables in the last step.<sup>8</sup> Because sample size did not allow for a reliable examination of ethnic differences, we created a dichotomous variable to roughly account for broad religious membership (Ecuadorians and Romanians were categorized as Christians, and Pakistani and Moroccan participants were categorized as Muslims). We controlled for ingroup attitudes because they were strongly correlated with outgroup reactions ( $r = .60, p < .001$ ), and it is useful to consider the extent to which one type of measure predicts the other (for a similar procedure, see Stangor & Thompson, 2002).

We ran four regression models for each set of social network variables separately due to the interdependence of some variables (e.g., the proportion of intra- and intergroup contacts in the network). In Model 1, we used the proportion of intragroup contacts and, in Model 2, the proportion of intergroup contacts among strong and weak ties as predictors. In Model 3, we regressed outgroup attitudes on ethnic diversity both among strong and weak ties. In Model 4, we examined four intragroup connectedness variables and, in Model 5, three intergroup connectedness variables as predictors of outgroup attitudes (additionally controlling for total connectedness in these models). Finally, we used the PROCESS macro for SPSS to test for moderation effects of openness to experience, controlling for the same variables (ingroup attitudes, gender, age, income, religion, and overall connectedness when appropriate).

## Results

### *Descriptive Results*

Table 1 shows descriptive statistics and bivariate correlations between the variables under study. On average, 62% of strong ties in the participants' networks were of the same ethnicity, and weak intragroup ties represented 23%. Furthermore, on average, 25% of each participant's (ego's) contacts were strong intergroup ties, and weak intergroup connections made up 45% of the network. As for ethnic diversity, on average, the probability that two randomly selected alters would be from two different groups was 43% among strong ties and 30% among weak ones. On average, a network was made up of eight connections among coethnic transnationals (with a group size  $M = 3.71, SD = 4.12$ ), 23 connections among coethnic locals (with a group size  $M = 8.85, SD = 4.50$ ), 15 connections among host nationals (group size  $M = 8.12, SD = 4.86$ ), and four connections among other nationalities (group size  $M = 4.30, SD = 3.17$ ).<sup>9</sup> Networks included, on average, 10 connections between coethnic locals and transnationals, 15 connections between coethnic locals and host nationals, and nine connections between coethnic locals and others.

### *Hierarchical Regression Analyses*

*Intra- and intergroup contacts among strong and weak ties.* First, we tested if network composition variables were relevant predictors of outgroup attitudes. As shown in Table 2 (Model 1), the proportion of intragroup contacts among strong ties was significantly and negatively associated with favorable outgroup attitudes, controlling for ingroup attitudes (i.e., willingness to interact with the ingroup), gender, age, income, and religion. In contrast, the proportion of intragroup relationships among weak ties was not a significant predictor of outgroup attitudes. As expected (H1), the proportion of strong intragroup relationships (i.e., same-ethnicity friendships, romantic partners, and relatives) was related to less favorable outgroup attitudes.

Further, the proportion of intergroup (host national) contacts among strong ties predicted positive outgroup attitudes, controlling for participants' ingroup attitudes as well as their sociodemographic characteristics (see Table 2, Model 2). As in the case of intragroup ties, the proportion of intergroup contacts among weak ties was not significantly associated with outgroup attitudes. Again, only the proportion of strong intergroup connections (i.e., Catalan and Spanish friendships, romantic partners, and relatives) predicted more favorable attitudes towards out-groups, in line with H2.

**Table 1.** Bivariate correlations among study variables (continues on next page)

	1	2	3	4	5	6	7	8	9	10
<i>M</i>					0.62	0.23	0.25	0.45	0.43	0.30
<i>(SD)</i>					(0.22)	(0.30)	(0.20)	(0.35)	(0.19)	(0.25)
1. Gender	1									
2. Age	.16	1								
3. Income	.06	-.02	1							
4. Religion	-.17	-.26**	-.08	1						
5. Intragroup contacts among strong ties ( $\hat{\rho}$ )	-.02	.09	-.22*	.04	1					
6. Intragroup contacts among weak ties ( $\hat{\rho}$ )	-.04	-.12	-.15	.07	.35***	1				
7. Intergroup contacts among strong ties ( $\hat{\rho}$ )	-.01	-.02	.20*	.02	-.81**	-.35**	1			
8. Intergroup contacts among weak ties ( $\hat{\rho}$ )	.03	.01	.25**	.06	-.28**	-.42**	.33**	1		
9. Ethnic diversity among strong ties	-.02	-.13	.13	-.05	-.85	-.32***	.60***	.25**	1	
10. Ethnic diversity among weak ties	-.02	.02	.05	.03	-.03	.18	.04	.11	.03	1
11. Connectedness	.11	.23*	.08	-.08	.08	-.15	-.03	-.13	-.06	-.17
12. Intragroup connectedness (CT)	.09	.34***	-.08	-.22*	.38**	.04	-.27**	-.04	-.35***	-.15
13. Intragroup connectedness (CL)	.02	-.07	-.08	.20*	.33***	.07	-.17	-.26**	-.17	-.15
14. Intragroup connectedness (C/S)	.03	.00	.25**	-.08	-.44	-.37***	.51***	.32***	.35***	.01
15. Intragroup connectedness (Oth)	.14	-.06	.14	-.10	-.22*	-.10	-.08	.06	.22*	.08
16. Intergroup connectedness (CL-CT)	.11	.27**	-.02	-.16	.32***	-.12	-.15	-.01	-.26**	-.25**
17. Intergroup connectedness (CL-C/S)	.08	.15	.10	-.02	-.22*	-.17	.21*	.09	.28**	-.01
18. Intergroup connectedness (CL-Oth)	.09	.03	-.01	-.13	-.06	-.09	-.08	.01	.20*	-.05
19. Ingroup attitudes	.03	-.03	.02	.08	-.03	-.06	.02	.10	.06	.07
20. Outgroup attitudes	.05	-.10	-.05	-.07	-.26**	-.08	.22*	.06	.31**	-.01
21. Openness to experience	.11	.08	.23*	-.15	-.16	-.10	.22*	.01	.14	.00

**Table 1.** Bivariate correlations among study variables (continued).

	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.
<i>M</i>	3.87	0.92	2.08	1.37	0.59	1.53	1.80	1.44	8.28	8.62	2.72
<i>(SD)</i>	(2.09)	(1.39)	(1.48)	(1.21)	(0.69)	(1.77)	(1.86)	(1.35)	(2.02)	(1.84)	(0.53)
12. Intragroup connectedness (CT)	.35**	1									
13. Intragroup connectedness (CL)	.57**	-.08	1								
14. Intragroup connectedness (C/S)	.38**	-.24**	.04	1							
15. Intragroup connectedness (Oth)	.12	-.07	-.11	-.06	1						
16. Intergroup connectedness (CL-CT)	.50**	.68***	.20*	-.05	-.14	1					
17. Intergroup connectedness (CL-C/S)	.67**	-.15	.38***	.53***	.01	.07	1				
18. Intergroup connectedness (CL-Oth)	.51**	-.04	.34***	.00	.48***	.06	.46***	1			
19. Ingroup attitudes	-.03	-.18*	.18*	.02	-.05	-.04	.08	.05	1		
20. Outgroup attitudes	-.01	-.31**	.12	.14	.03	-.11	.23*	.16	.60***	1	
21. Openness to experience	.08	-.05	-.05	.14	-.05	-.04	.15	.11	.13	.23*	1

Note. N = 98/122. \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ . Gender: 1 = male, 2 = female; age = age in years; income (1 = less than €500 per month, 6 = more than €2,500 per month); religion = group membership (Muslim vs. Christian); intragroup contacts ( $\hat{\rho}$ ) = proportion of alters with the same ethnic background; intergroup contacts ( $\hat{\rho}$ ) = proportion of Catalan and Spanish contacts; strong ties = friends, romantic partners, and relatives; weak ties = colleagues from work/school peers, neighbors, acquaintances; ethnic diversity = the probability that two randomly selected alters are from two different ethnic/cultural groups (coethnic contacts, host nationals, culturally diverse others); connectedness = number of connections in the network (divided by network size); intragroup connectedness = number of connections among same-ethnicity contacts (weighted by group size); intergroup connectedness = number of connections between different-ethnicity contacts (weighted by the geometric mean of the two group sizes); CT = coethnic transnational contacts in the country of origin; CL = coethnic local contacts in the host country; C/S = host national contacts (Catalans/Spaniards); Oth = other culturally diverse contacts.

**Table 2.** Outgroup attitudes regressed on personal social network composition (proportion of intra and intergroup contacts among strong and weak ties).

	Step 1					Step 2					Step 3								
	B	(SE)	$\beta$	p	95%CI	B	(SE)	$\beta$	p	95%CI	B	(SE)	$\beta$	p	95%CI				
<b>Model 1: Proportion of strong and weak intragroup ties</b>																			
Gender	0.20	(0.36)	.05	.577	-0.51	0.92	0.11	(0.29)	.03	.710	-0.46	0.67	0.09	(0.27)	.03	.733	-0.45	0.64	
Age	-0.02	(0.02)	-.13	.179	-0.06	0.01	-0.02	(0.01)	-.12	.117	-0.05	0.01	-0.02	(0.01)	-.10	.212	-0.04	0.01	
Income	-0.08	(0.12)	-.06	.517	-0.32	0.16	-0.10	(0.10)	-.08	.321	-0.29	0.10	-0.16	(0.09)	-.13	.089	-0.35	0.03	
Religion	-0.36	(0.36)	-.10	.325	-1.08	0.36	-0.56	(0.29)	-.15	.056	-1.13	0.02	-0.51	(0.28)	-.14	.069	-1.06	0.04	
Ingroup attitudes						0.56	(0.07)	.61	<.001	0.42	0.70	0.56	(0.07)	.61	<.001	0.43	0.69		
Intragroup contacts among strong ties ( $\hat{\rho}$ )											-2.16	(0.65)	-.26	.001	-3.45	-0.87			
Intragroup contacts among weak ties ( $\hat{\rho}$ )											0.16	(0.47)	.03	.738	-0.78	1.10			
R <sup>2</sup> change						.03				.37									0.6
<b>Model 2: Proportion of strong and weak intergroup ties</b>																			
Gender											0.13	(0.28)	.03	.65	-0.43	0.68			
Age											-0.02	(0.01)	-.12	.11	-0.05	0.01			
Income											-0.13	(0.10)	-.10	.18	-0.33	0.06			
Religion											-0.56	(0.28)	-.15	.05	-1.12	0.00			
Ingroup attitudes											0.55	(0.07)	.60	.00	0.42	0.68			
Intergroup contacts among strong ties ( $\hat{\rho}$ )											2.11	(0.74)	.22	.01	0.65	3.57			
Intergroup contacts among weak ties ( $\hat{\rho}$ )											-0.31	(0.41)	-.06	.46	-1.12	0.52			
R <sup>2</sup> change						.03				.37									.04

Note: N=114. Gender: 1 = male, 2 = female; age = age in years; income (1 = less than €500 per month, 6 = more than €2,500 per month); religion = group membership (Muslim vs. Christian); intragroup contacts ( $\hat{\rho}$ )= proportion of alters with the same ethnic background; intergroup contacts ( $\hat{\rho}$ )= proportion of Catalan and Spanish contacts; strong ties = friends, romantic partners, and relatives; weak ties = colleagues from work/school, peers, neighbors, acquaintances.

*Ethnic diversity among strong and weak ties.* Supporting H3, ethnic diversity among strong ties was a significant and positive predictor of participants' outgroup attitudes over and above the effects of ingroup attitudes and sociodemographic characteristics (see Table 3, Model 3). In turn, the relationship between ethnic diversity among weak ties and outgroup attitudes was not statistically significant. That is, ethnic diversity among close network members (but not among the broader network) was significantly and positively linked to more favorable outgroup attitudes.<sup>10</sup>

*Intra- and intergroup connectedness.* The last two regression models tested the relationship between connectedness and outgroup attitudes. Intragroup connectedness (i.e., ties among coethnic transnational alters) was significantly and negatively associated with outgroup attitudes, after controlling for ingroup attitudes and sociodemographic characteristics. Intragroup connectedness among coethnic locals did not predict outgroup attitudes (see Table 4, Model 4). Hypothesis 4 was thus only partially supported. Connectedness among host nationals and culturally diverse others, both tested in an exploratory way, were not associated with outgroup attitudes.

Among the intergroup connectedness variables (see Table 4, Model 5), connectedness between coethnic locals and host nationals predicted favorable outgroup attitudes, in line with H5. Intergroup connectedness of coethnic locals with either coethnic transnationals or other groups (tested in an exploratory way) was not significantly associated with outgroup attitudes.

### *The Moderating Role of Personality*

Next, we tested the extent to which the trait of openness to experience moderated the expected link between social network variables and out-group attitudes. We only present moderation effects for the network variables shown to significantly predict outgroup attitudes in the regression analyses. No other moderation effects were detected.

**Table 3.** Outgroup attitudes regressed on personal social network composition (ethnic diversity).

	Step 1			Step 2			Step 3											
	B	(SE)	p	B	(SE)	p	B	(SE)	p									
Gender	0.20	(0.39)	.05	.606	-.57	0.98	0.11	(0.31)	.03	.732	-0.51	0.72	0.13	(0.30)	.03	.673	-0.46	0.72
Age	-0.02	(0.02)	-.13	.215	-0.06	0.01	-0.02	(0.02)	-.12	.148	-0.05	0.01	-0.02	(0.02)	-.09	.256	-0.05	0.01
Income	-0.08	(0.13)	-.06	.550	-0.34	0.18	-0.10	(0.12)	-.08	.360	-0.30	0.11	-0.13	(0.10)	-.10	.193	-0.33	0.07
Religion	-0.36	(0.39)	-.10	.363	-1.14	0.43	-0.56	(0.31)	-.15	.078	-1.18	0.06	-0.47	(0.30)	-.13	.124	-1.07	0.13
Ingroup attitudes							0.56	(0.07)	.61	<.001	0.41	0.71	0.55	(0.07)	.60	<.001	0.40	0.69
Ethnic diversity among strong ties													2.66	(0.71)	.27	<.001	1.25	4.07
Ethnic diversity among weak ties													-0.40	(0.52)	-.05	.451	-1.43	0.64
R <sup>2</sup> change							.03					.37						.07

*Note.* N = 98. Gender: 1 = male, 2 = female; age = age in years; income (1 = less than €500 per month, 6 = more than €2,500 per month); religion = group membership (Muslim vs. Christian); strong ties = friends, romantic partners, and relatives; weak ties = colleagues from work/school peers, neighbors, acquaintances; ethnic diversity = the probability that two randomly selected alters are from two different ethnic/cultural groups (coethnic contacts, host nationals, culturally diverse others).

**Table 4.** Outgroup attitudes regressed on personal social network structure (intragroup and intergroup connectedness).

	Step 1				Step 2				Step 3									
	B	(SE)	$\beta$	p	B	(SE)	$\beta$	p	B	(SE)	$\beta$	p	95% CI					
<b>Model 4: Intragroup connectedness</b>																		
Gender	0.20	(0.36)	.05	.577	-0.51	0.92	0.10	(0.29)	.03	.735	-0.47	0.67	0.12	(0.28)	.03	0.669	-0.44	0.68
Age	-0.02	(0.02)	-.13	.179	-0.06	0.01	-0.02	(0.01)	-.13	.105	-0.05	0.01	-0.01	(0.02)	-.08	0.334	-0.04	0.02
Income	-0.08	(0.12)	-.06	.517	-0.32	0.16	-0.10	(0.10)	-.08	.307	-0.29	0.09	-0.15	(0.10)	-.12	0.120	-0.35	0.04
Religion	-0.36	(0.36)	-.10	.325	-1.08	0.36	-0.56	(0.29)	-.15	.057	-1.13	0.02	-0.64	(0.29)	-.17	0.030	-1.22	-0.06
Ingroup attitudes					0.56	(0.07)	.61	.000	.61	.000	0.42	0.70	0.53	(0.07)	.59	0.000	0.40	0.67
Connectedness					0.03	(0.07)	.04	.654	.04	.654	-0.11	0.17	0.16	(0.13)	.18	0.235	-0.11	0.43
Intragroup connectedness (CT)													-0.39	(0.15)	-.30	0.008	-0.69	-0.10
Intragroup connectedness (CL)													-0.12	(0.15)	-.09	0.444	-0.42	0.18
Intragroup connectedness (C/S)													0.00	(0.16)	.00	1.000	-0.33	0.33
Intragroup connectedness (Oth)													-0.03	(0.23)	-.01	0.909	-0.48	0.42
R <sup>2</sup> change																		.06
<b>Model 5: Intergroup connectedness</b>																		
Gender													0.09	(0.28)	.02	0.759	-0.46	0.63
Age													-0.02	(0.01)	-.13	0.108	-0.05	0.01
Income													-0.11	(0.09)	-.09	0.238	-0.30	0.07
Religion													-0.56	(0.28)	-.15	0.052	-1.12	0.01
Ingroup attitudes													0.53	(0.07)	.58	0.000	0.40	0.66
Connectedness													-0.20	(0.12)	-.22	0.096	-0.43	0.04
Intergroup connectedness (CL-CT)													0.01	(0.10)	.01	0.895	-0.19	0.21
Intergroup connectedness (CL-C/S)													0.32	(0.11)	.32	0.004	0.10	0.53
Intergroup connectedness (CL-Oth)													0.10	(0.12)	.07	0.430	-0.15	0.34
R <sup>2</sup> change																		.06

Note. N = 114. Gender: 1 = male, 2 = female; age = age in years; income (1 = less than €500 per month, 6 = more than €2,500 per month); religion = group membership (Muslim vs. Christian); connectedness = number of connections in the network (divided by network size); intragroup connectedness = number of connections among same-ethnicity contacts (weighted by group size); intergroup connectedness = number of connections between different-ethnicity contacts (weighted by the geometric mean of the two group sizes); CT = coethnic transnational contacts in the country of origin; CL = coethnic local contacts in the host country; C/S = host national contacts (Catalans/Spaniards); oth = other culturally diverse contacts.

*Intra- and intergroup contacts among strong ties.* As it can be seen in Table 5, moderation analyses showed a significant interaction effect between openness to experience and the proportion of intragroup contacts among strong ties on predicting outgroup attitudes. Accordingly, subsequent simple slopes analyses (see Figure 2) revealed that the proportion of intragroup contacts among strong ties was associated with more negative outgroup attitudes among participants who scored low and moderately on openness to experience, but not among those with high scores on this trait. We did not find a significant interaction effect between openness to experience and the proportion of intergroup contacts among strong ties on outgroup attitudes, but the effect was in the expected direction.

*Ethnic diversity among strong ties.* The interaction effect between openness to experience and ethnic diversity among strong ties was not statistically significant, although it was in the expected direction.

*Intergroup connectedness.* Moderation analyses revealed a significant interaction effect for openness to experience and connectedness between coethnic locals and host nationals. The negative link between favorable outgroup attitudes and low levels of this type of connectedness was stronger among participants with low and moderate levels of openness (see Figure 3).

## **Discussion**

The present research examined in a culturally diverse community sample of immigrants whether the content and structure of their habitual social networks were predictive of their outgroup attitudes, considering intra- and intergroup processes, type of relationship, and the role of personality. Concerning network content, we found that the proportion of intragroup contacts representing strong ties (i.e., close relations with coethnic fellows) was associated with less favorable outgroup attitudes, while both the proportion of intergroup contacts representing strong ties (i.e., close relations with Catalans and Spaniards) and ethnic diversity among strong ties were associated with more favorable outgroup attitudes. Regarding network structure, the higher the connectedness (i.e., number of connections) between coethnic locals and host nationals, and the lower the connectedness among coethnic contacts in the country of origin, the more positive immigrants' outgroup attitudes were. Importantly, these associations between network compositional and structural features and outgroup attitudes were stronger among individuals low in openness to experience.

### *Personal Social Network Content, Tie Strength, and Immigrants' Outgroup Attitudes*

Our research sheds light on the importance of social network methodologies in understanding social relationships in the intergroup context. We provided further empirical evidence that meso-level social network data clarify subjective psychological reality, in line with previous studies (Mok et al., 2007; Munniksma et al., 2013; Repke & Benet-Martínez, 2017, 2018; Wölfer et al., 2016, 2017). Consistent with research on minority and majority high school students across Europe (Wölfer et al., 2017), we found that the higher the proportion of intergroup contacts among strong ties (i.e., host national friends and relatives) within immigrants' personal social networks, the more favorable their attitudes towards ethnically different others. Further, extending earlier research, we also tested the role of within-group processes—intragroup relationships within the network. A novel finding is that close social interactions (i.e., strong ties) with coethnic contacts are negatively linked with favorable out-group attitudes.

These results resonate with evidence of a zero-sum interdependency between intragroup and intergroup contact in predicting outgroup attitudes (Levin et al., 2003), as well as of the negative impact that ethnically homogenous social environments have on outgroup attitudes (Oliver & Wong, 2003). Yet these findings diverge from evidence on the benefits of both coethnic and host



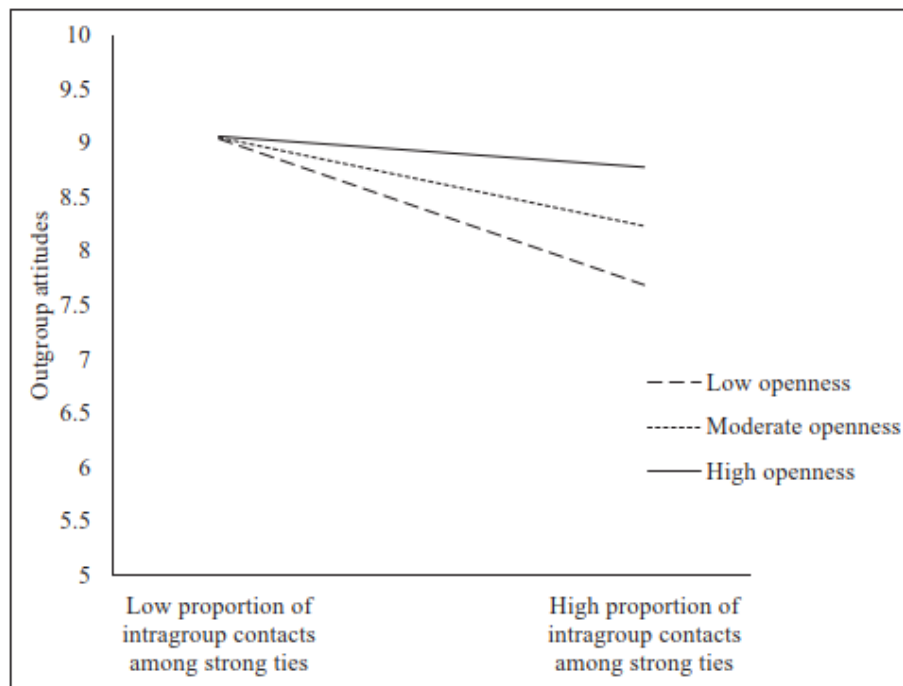
**Table 5.** Outgroup attitudes regressed on personal social networks' content and structure moderated by openness to experience.

	<i>B</i>	( <i>SE</i> )	<i>p</i>	95% CI
<b>Model 1: Interaction</b>				
Openness to experience	0.53	(0.26)	.048	[0.01, 1.05]
Intragroup contacts among strong ties ( $\hat{p}$ ) <sup>a</sup>	-1.82	(0.60)	.003	[-3.02, -0.62]
Openness to experience x intragroup contacts among strong ties ( $\hat{p}$ )	2.24	(1.12)	.049	[0.01, 4.47]
<b>Model 1: Simple slopes</b>				
Low openness to experience	-3.00	(0.80)	.000	[-4.59, -1.42]
Moderate openness to experience	-1.82	(0.60)	.003	[-3.02, -0.62]
High openness to experience	-0.64	(0.89)	.476	[-2.40, 1.13]
<b>Model 2: Interaction</b>				
Openness to experience	0.49	(0.27)	.071	[-0.04, 1.03]
Intergroup contacts among strong ties ( $\hat{p}$ )	1.86	(0.70)	.009	[0.47, 3.24]
Openness to experience x intergroup contacts among strong ties ( $\hat{p}$ )	-2.57	(1.35)	.060	[-5.24, 0.11]
<b>Model 3: Interaction</b>				
Openness to experience	0.54	(0.26)	.041	[0.02, 1.07]
Ethnic diversity among strong ties	2.18	(0.74)	.004	[0.71, 3.64]
Openness to experience x ethnic diversity among strong ties	-2.07	(1.33)	.124	[-4.70, 0.57]
<b>Model 4: Interaction</b>				
Openness to experience	0.49	(0.28)	.033	[0.05, 1.16]
Intragroup connectedness (CT)	-0.35	(0.12)	.004	[-0.58, -0.12]
Openness to experience x intragroup connectedness (CT)	-0.03	(0.20)	.862	[-0.50, 0.30]
<b>Model 4: Simple slopes</b>				
Low openness to experience	-0.05	(0.14)	.741	[-0.32, 0.23]
Moderate openness to experience	-0.10	(0.08)	.227	[-0.26, 0.06]
High openness to experience	-0.15	(0.13)	.244	[-0.42, 0.11]
<b>Model 5: Interaction</b>				
Openness to experience	0.37	(0.28)	.185	[-0.18, 0.92]
Intergroup connectedness (CL-C/S)	0.37	(0.11)	.001	[0.15, 0.58]
Openness to experience x intergroup connectedness (CL-C/S)	-0.35	(0.18)	.049	[-0.72, -0.002]
<b>Model 5: Simple slopes</b>				
Low openness to experience	0.55	(0.16)	.001	[0.22, 0.88]
Moderate openness to experience	0.36	(0.11)	.001	[0.15, 0.58]
High openness to experience	0.18	(0.12)	.128	[-0.05, 0.41]

*Note.* *N* = 114. <sup>a</sup> $\hat{p}$  = Proportion. Models are controlled for ingroup attitudes, gender, age, income, religion (Christian vs. Muslim), and additionally for overall connectedness in Models 4 and 5.

Intergroup contacts ( $\hat{p}$ ) = proportion of Catalan and Spanish contacts; strong ties = friends, romantic partners, and relatives; weak ties = colleagues from work/school peers, neighbors, acquaintances; ethnic diversity = the probability that two randomly selected alters are from two different ethnic/cultural groups (coethnic contacts, host nationals, culturally diverse others); intragroup connectedness = number of connections among same-ethnicity contacts (weighted by group size); intergroup connectedness = number of connections between different-ethnicity contacts (weighted by the geometric mean of the two group sizes); CT = coethnic transnational contacts in the country of origin; CL = coethnic local contacts in the host country; C/S = host national contacts (Catalans/Spaniards); oth = other culturally diverse contacts.

**Figure 2.** The relationship between the proportion of strong intragroup ties and outgroup attitudes moderated by openness to experience.



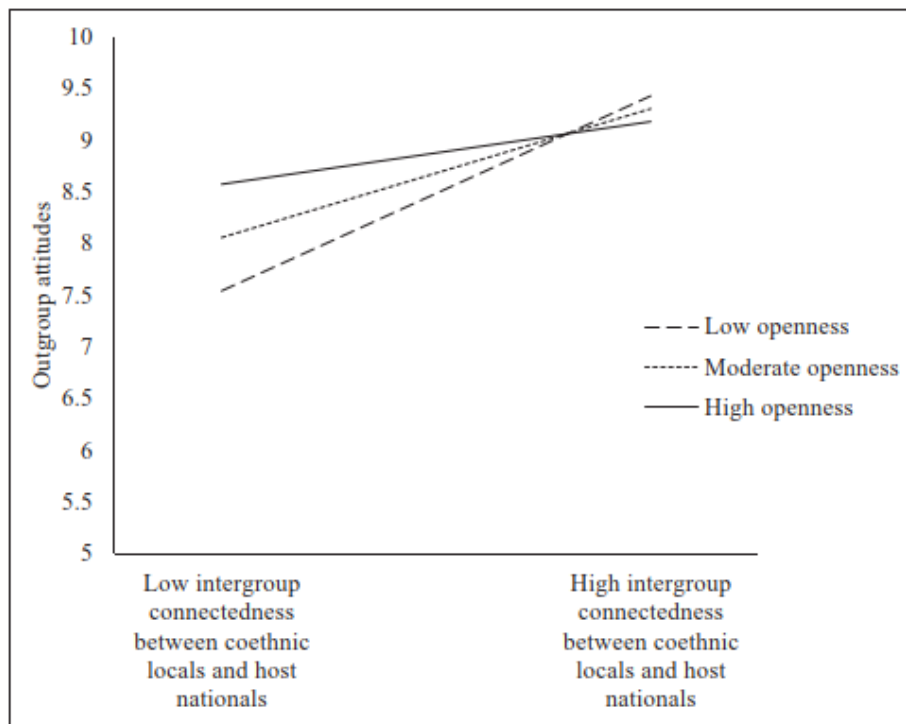
Note.  $N = 114$ . Intragroup contacts ( $\hat{p}$ ) = proportion of alters with the same ethnic background; strong ties = friends, romantic partners, and relatives. The original response scale for outgroup attitudes was from 0 to 10 but it is shown here from 5 to 10 for clarity. Controlled for gender, age, income, religion (Christians vs. Muslims), and ingroup attitudes.

social support networks for immigrants' adjustment (e.g., Jasinskaja-Lahti et al., 2006), thus portraying a complex picture of coethnic support as a double-edged process, beneficial for psychological functioning but possibly deleterious for out-group attitudes. It is worth noting that, in our study, positive ingroup attitudes were generally strongly associated with favorable outgroup attitudes, which suggests that ingroup love and outgroup hate are not a zero-sum game but rather exist independently and are driven by distinct motivations (Brewer, 1999). This idea is in line with our findings on the role of ethnic diversity and connectedness, suggesting that the mere proportion of intragroup or intergroup ties is not enough to reflect the nature of contact dynamics.

Our research additionally revealed that the higher the ethnic diversity among closer contacts (i.e., probability that two alters belong to two different social groups), the more favorable immigrants' attitudes towards outgroup members. Importantly, we used a fractionalization measure (Alesina et al., 2003; Fearon, 2003), which constitutes a more appropriate reflection of diversity given that the mere proportion of outgroup contacts does not properly capture the phenomenon of diverse relationships. All in all, our research shows that, in line with the extended contact framework (Wright et al., 1997), including social network research on extended outgroup friendships (Munniksma et al., 2013; Stark, 2020; Wölfer et al., 2017), our social realities are affected not only by direct contacts who are culturally different from oneself but also by the diversity of these contacts. Thus, consistent with the mentioned previous research, our study supports the importance of considering the type of relationships people have with diverse others.

Our study also indicates that casual acquaintances (i.e., weak ties) in the network seem irrelevant to immigrants' outgroup attitudes. As predicted, we did not find a link between the proportion of weak intragroup or intergroup contacts in the network (regardless of their ethnicity) and outgroup attitudes.<sup>11</sup> Thus, it seems that weak ties, which often involve casual encounters and fewer

**Figure 3.** The relationship of intergroup connectedness between coethnic locals and host nationals with outgroup attitudes moderated by openness to experience.



*Note.*  $N = 114$ . Intergroup connectedness = number of connections between different-ethnicity contacts (weighted by the geometric mean of the two group sizes). The original response scale for outgroup attitudes was from 0 to 10 but it is shown here from 5 to 10 for clarity. Controlled for gender, age, income, religion (Christians vs. Muslims), ingroup attitudes, and connectedness.

opportunities for observing a wide range of behaviors, are not powerful enough for individuals to change their belief systems, including attitudes towards outgroups (Centola & Macy, 2007). These findings are consistent with evidence showing that occasional intergroup encounters have ambivalent consequences for outgroup attitudes (Hainmueller & Hopkins, 2014).

### *Personal Social Network Structure and Immigrants' Outgroup Attitudes*

Previous research has suggested that social network data can be particularly useful to analyze processes that go beyond direct contact (Munniksma et al., 2013; Stark, 2015, 2020; Wölfer et al., 2017). We further extend these contributions by bringing into focus an additional feature of contact—connectedness (i.e., number of connections among/between same-ethnicity and different-ethnicity social network contacts). Our results indicate that a particular type of inter-group connectedness—that between coethnic local and host national contacts—is critical for fostering favorable outgroup attitudes, in line with a recent study by Stark (2020). This result also provides a meso-level validation of the finding that individuals with dual or integrated bicultural identities are more likely to respond positively towards outgroup members (Huff et al., 2017, 2020).

Although tested in an exploratory way, we did not find any significant effects for the amount of connectedness between coethnic local and trans-national contacts. Perhaps the number of these connections in the social network depends on whether the immigrant's family members live in the host country (and thus coded within the coethnic local category) or in the country of origin (coded within the coethnic transnational category). Connectedness between coethnic contacts and those belonging to other ethnocultural groups was

also irrelevant to immigrants' outgroup attitudes. To the extent that the latter type of contacts might involve other minority individuals, in some cases of different national backgrounds but same religion (e.g., Moroccan contacts of Pakistanis and vice versa), one could speculate that these contacts are more similar to intragroup social relationships. Confirming this idea, among Latinx and Black college students, the negative interdependency between ingroup and outgroup friendships held only with regard to majority Whites and Asians (considered a high-status minority) but not regarding friendships with Black and Latinx individuals, respectively (Levin et al., 2003), thus indicating that some minority groups may be considered more relationally proximate than others. Intergroup outcomes may depend on the social status hierarchy among minority groups, with higher status minorities benefiting more from contact with lower status minorities than vice versa (Bikmen, 2011).

Regarding the structure of intragroup contacts, we showed that connectedness among coethnic transnationals (i.e., contacts in the country of origin) is negatively related to immigrants' positive outgroup attitudes. This finding is not surprising if one considers that these contacts might be mostly the immigrant's family members who stayed in the country of origin. Tight family relationships have been shown to shape ideological attitudes, including the perception of minority groups (e.g., Huijnk et al., 2013; Paterson et al., 2015). It is thus possible that highly cohesive and structured families exercise influence on emigrated individuals from a distance (e.g., regarding whom they should befriend, date, or marry).

Surprisingly, intragroup connectedness among coethnic locals, host nationals, or other cultural groups was irrelevant to shaping immigrants' outgroup attitudes. The fact that connectedness among transnational coethnic contacts is negatively linked to favorable outgroup attitudes, but connectedness among local coethnic contacts is not, is worth discussing. Members of the first group are probably in regular contact with the emigrated individual (ego) and, as mentioned before, share strong normative expectations. Also, these contacts are perhaps not regularly exposed to a different culture and have fewer opportunities for intercultural interactions. Therefore, their viewpoint concerning interethnic relations may be more traditional than that of their coethnic fellows who emigrated.

### *The Role of Openness to Experience*

Our research also provides insight into the role of personality in explaining the association between social network characteristics and outgroup attitudes. Specifically, we showed that having personal social networks that lack ethnic diversity (i.e., a high proportion of coethnic ties, and low connectedness between coethnic local and host national contacts) has a negative impact on outgroup attitudes only for individuals with low (or moderate) levels of openness to experience. High openness to experience seems to buffer against the effects of lack of diversity in the social network. Perhaps immigrants who are dispositionally open to experience more actively seek other ways to experience diversity, particularly when opportunities for intergroup contact are low due to structural factors such as living in an ethnic enclave or having recently arrived in the host country.

These results are congruent with past empirical evidence showing that personality factors related to cognitive and emotional rigidity (e.g., high need for cognitive closure, low agreeableness, low extraversion) moderate the link between intergroup contact and prejudice (Danckert et al., 2017; Dhont et al., 2011; Turner et al., 2014). Nevertheless, previous empirical evidence involving trait openness to experience relied on explicit self-reports of broader intergroup exposure or interactions (Danckert et al., 2017), and some studies did not find moderation effects for openness (Turner et al., 2014). Thus, future research should further explore the interplay between personality dimensions, type of relationship, and contact in explaining prejudice.

### *Limitations and Future Research*

The present study is not devoid of limitations. First, we did not consider the role of relationship

quality. Recent social network research takes into account both positive and negative relationships (i.e., relations involving friendship and cooperation, and also those characterized by conflict and bullying) to explore their differential effects on outgroup attitudes (Wölfer et al., 2017). Thus, we are aware that choosing a type of bond (e.g., family kin or friendship) as a parameter for assessing tie strength implies a certain bias. While strong relationships in our study might be more likely to involve positive contact (friendships, romantic partners), weaker bonds may be either of positive or negative valence. Similarly, it is also possible that a person has a distant (not warm and not close) relationship with a family member. Contact research should address this issue by differentiating between positive and negative contact within strong and weak relations whenever possible. Social network techniques could be used to less obtrusively capture discrimination and prejudice among immigrants, taking also into consideration the possibility that these experiences can stem not only from negative contact with dominant-culture alters but also from negative interactions with those of the same ethnic group or other minorities (Córdova & Cervantes, 2010).

In addition, it is important to take into account that immigrants' strong intergroup ties most probably derive from initially weak relations established at the beginning of the migratory process. This temporal complexity of immigrants' intercultural networks should be addressed in future longitudinal research (see e.g., Lubbers et al., 2010). Finally, it is necessary to take into account that the low proportion of strong outgroup ties found in the study may be due to the fact that, generally speaking, it is less likely to have intergroup contacts who are family members, whereas the opposite is true for intragroup contacts.

Further, although we used a research design where variables measured in T1 were used as predictors, and variables from T2 as outcomes, it is not possible to ascertain the directionality of our effects. Even if it is probable that variations in net-work composition and structure are predictive of future outgroup attitudes, it is also plausible to expect that, in line with the selection bias hypothesis (Binder et al., 2009; Hewstone & Swart, 2011; Stark, 2015), prejudice and negative outgroup attitudes prevent the development of intergroup contacts in the network. Moreover, our social network measures reflected social relationships with specific ethnic group categories (e.g., Catalans or Spaniards), whereas our outgroup attitudes measure extends to a broader category of anyone ethnically different to oneself. Intuitively, one could argue that a context-specific social relationship (e.g., friendship with a Catalan) can generalize over attitudes towards outgroup members more broadly (much more than the other way around). Nevertheless, this causality direction cannot be concluded from our data, and thus future research should longitudinally examine this relation.

Another limitation is the relatively small size of our sample; yet community samples are hard to reach and underrepresented in mainstream social psychological research. Also, given the limited number of participants from each ethnic group, we could not explore group differences in the link between social network characteristics and outgroup attitudes. Still, a strength of this research is that it is not limited to one ethnic group, which would have hindered the generalization of our findings to other migrant groups in Spain. Future research should keep in mind not only the differential effects of personal social networks depending on one's ethnic background, but also that people's social realities can be defined by their memberships in multiple social groups, which is relevant in the study of intergroup contact (Dovidio et al., 2017).

Also, we focused exclusively on openness to experience as a moderator of the link between personal social network characteristics and out-group attitudes. Other personality factors or individual differences in ideology may also moderate the link between contact and prejudice (Asbrock et al., 2012; Dhont et al., 2011; Dhont & van Hiel, 2011; Hodson, 2008; Hodson et al., 2009; Turner et al., 2014). For instance, it is plausible that the effects of social network variables depend on levels of social dominance orientation, right-wing authoritarianism, or religious extremism. This is an issue for future research to explore.

Extant qualitative research (Domínguez & Hollstein, 2014; Ryan & D'Angelo, 2018) has also drawn attention to other aspects of intergroup contact that have been neglected by quantitative research, including social network studies. Considering results from in-depth interviews (e.g., Kim, 2012), future research should study the challenges and opportunities that characterize intergroup contact among minority groups, including the role of engagement in recreation activities as a facilitator of positive intergroup interactions. Given that minority group members frequently lack enough intergroup contact opportunities, many European cities are implementing a broad variety of activities to foster intercultural relations (e.g., Wood, 2010). There is evidence showing that participation in intercultural contact-based activities enhances minority group members' adjustment (Zumeta et al., in press). Future studies should explore to what extent diversity programs and initiatives contribute to establishing more diverse personal networks and positive outgroup attitudes among members of both minority and majority groups.

## Conclusion

Meso-level social network data are particularly useful for describing and understanding social relationships beyond individual-level, explicit measures of social contact. Our research extends previous empirical evidence by examining the effects of personal social networks on outgroup attitudes using an ethnically diverse immigrant sample. We showed that intragroup processes in one's social network—here understood as the proportion of close, same-ethnicity contacts—and connectedness among same-ethnicity contacts in the country of origin are linked to more negative outgroup attitudes. In turn, intercultural-ism in one's social network, that is, the number of close intergroup contacts, the diversity among close contacts, and also the connectedness between same-ethnicity and different-ethnicity contacts, is associated with favorable outgroup attitudes. Lastly, it is important to note that personality differences in openness to experience may boost or inhibit these effects. More research should take advantage of the potential that social network methodology offers for the study of migration, acculturation, and intergroup processes more broadly.

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## Notes

1. We draw on a definition of relational embeddedness by Nahapiet and Ghoshal (1998, p. 244): "the particular relations people have, such as respect and friendship, that influence their behavior. It is through these ongoing personal relationships that people fulfill such social motives as sociability, approval, and prestige."
2. We did not account for tie strength when examining the effects of connectedness because we did not register type of relationships between alter's contacts in the network.
3. On the advice of experts from the network of civil society associations in Barcelona, we located diverse and relevant organizations to maximize representativeness and minimize data dependency. Also, respondents were instructed not to invite their contacts to participate.
4. When in situ data collection was not possible, an online survey was made available to participants ( $n = 16$ ).
5. The original participants were not recruited for a two-stage data collection, so they did not know that they would be offered to participate in another study 2 years later. We aimed to recruit as many participants as possible for a balanced subsample, and tried to minimize attrition. For the first part

of the task (social network measure), most participants took around 30 minutes to answer, with only a few requiring up to 60 minutes to complete it. Research assistants were available to help with difficulties in filling out the social network measure. Further, after providing social network data, participants were given a quick visual feedback on their social network. Note that no assumptions or interpretations of participants' social networks were provided. The second part of the task included questions regarding language usage and proficiency, acculturation strategies, cultural self-identification, psychological adjustment, standard demographics, and migratory experience.

6. Whenever a contact fulfilled several social roles (e.g., friend and work colleague), the participant (ego) was asked to choose the most important category.
7. Number of missing values in our data was low: only 5.7% of participants did not provide information about their income, and one participant (0.8%) did not complete the ingroup and outgroup attitudes scales.
8. Regression results remained the same when controlling for education level.
9. We report the number of existing connections in each participant's network (each with 300 possible connections).
10. For exploratory purposes, we additionally tested regression models where interactions between strong and weak ties were included, to check for the possibility that weak ties are relevant predictors of outgroup attitudes when there is a lack (or low presence) of strong intercultural, diverse, or intracultural relationships. Controlling for ingroup attitudes, gender, age, income, and religion, the interaction effects between (a) intracultural strong and weak ties ( $p = .996$ ), (b) intercultural strong and weak ties ( $p = .730$ ), and (c) ethnic diversity among strong and weak ties ( $p = .798$ ) were all nonsignificant.
11. Previous research (Repke & Benet-Martínez, 2018) has shown weak host ties to be more relevant than strong host ties to predicting immigrants' adjustment. This is probably because this type of relationships (i.e., acquaintances, coworkers) are more conducive to instrumental (vs. personal) informational exchanges that facilitate access to resources (e.g., Kim, 2012) and the acquisition of culturally appropriate skills (Martínez-García et al., 2002)

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