ORIGINAL RESEARCH

Intergroup Contact Alleviates Loneliness: The Extensive Effect of Common Ingroup Identity

Dongfang Yu [ID][1,2,]*, Jinhua Bai[3,]*, Yufang Zhao[1,3], Chenzu Yin[4], Fangmei Liang[4], Jun Zhang[5]

[1]Center for Studies of Education and Psychology of Ethnic Minorities in Southwest China, Southwest University, Chongqing, Peoples Republic of China; [2]Reader Service Department, Guangxi University of Finance and Economics, Nanning, Peoples Republic of China; [3]Faculty of Psychology, Southwest University, Chongqing, Peoples Republic of China; [4]School of Teacher Education, Hechi University, Hechi, Peoples Republic of China; [5]College of International Studies, Southwest University, Chongqing, Peoples Republic of China

*These authors contributed equally to this work

Correspondence: Yufang Zhao, Faculty of Psychology, Southwest University, Chongqing, 400715, Peoples Republic of China, Email zhaobee@swu.edu.cn

Purpose: Previous studies show that intergroup contact, through common ingroup identity, has impact on intergroup processes such as reducing intergroup bias, improving intergroup relations, etc. The effect of intergroup contact on individual psychological process (through common ingroup identity), however, needs further exploration. Based on the positive effect of both intergroup contact and ingroup identification on mental health and well-being, this article proposes and tests a new model of individual loneliness reduction through intergroup contact by promoting common ingroup identity.

Methods: A total of 263 majority ethnic members and 275 minority ethnic members from China participated in the survey. Intergroup contact, common ingroup identity and loneliness were measured at three time-points (T1-T3) over an 8-month period. Longitudinal mediation analysis and parallel process Latent Growth Curve Model for mediation are used for the examination of the indirect effect of common ingroup identity.

Results: Longitudinal mediation analysis showed that intergroup contact quality at T1 positively predicted common ingroup identity at T2, and common ingroup identity at T2 alleviated loneliness at T3. Intergroup contact quality at T1 was indirectly linked to loneliness at T3 via common ingroup identity at T2. The parallel process latent growth curve model for mediation confirmed the robustness of the indirect effect of common ingroup identity. In addition, the growth rate of the quality of intergroup contact increased the growth rate of common ingroup identity, but reduced the growth rate of loneliness.

Conclusion: The current study revealed the protectiveness of intergroup contact and common ingroup identity on loneliness, viz., intergroup contact reduces individual loneliness by promoting common ingroup identity, the implication being that intergroup contact and common ingroup identity should be taken into account in intervening process of loneliness prevention so that an individual's physical and mental health could be better safeguarded.

Keywords: intergroup contact, common ingroup identity, loneliness, group-based intervention

Introduction

Loneliness is defined as a negative emotional perception to the discrepancy between desired and actual quality or quantity of social relationships.[1,2] It induces various kinds of negative consequences of physical and mental health.[3] In order to effectively reduce loneliness and protect physical and mental health of individuals, researchers proposed several interventions, such as group interventions, one-to-one interventions,[4,5] and found that group-based interventions are more effective than one-to-one interventions.[6] However, how do groups protect from loneliness? Some recent work raised the effect of ingroup and intergroup contact on mental health,[1] and suggested that group membership, ie, the sense of social identification derived from membership, is a strong predictor of mental health,[7] but few studies investigated the potential mechanism of intergroup contact on mental health and loneliness. In the present study, we proposed and tested a loneliness alleviation model by intergroup contact through common ingroup identity.

Loneliness

Almost all people have experienced loneliness at some point in their life.[8] For most people, loneliness is transient, but for some, loneliness is chronic.[9] Loneliness severely impacts individuals' well-being[10,11] and impairs their physical and mental health. The past studies found an association between increased levels of loneliness and multimorbidity, such as elevated blood pressure, disrupted sleep and dysregulation of neuroendocrine and immune responses;[12] and it is also related to various negative psychological symptoms, for instance, cognitive performance and cognitive decline over time,[13,14] depression[15,16] and anxiety.[17]

The core feature of loneliness is lacking of belonging,[18] and loneliness is regarded as an important indicator of threatened belongingness needs.[19] Failure to have belongingness needs met may lead to feelings of social isolation, alienation and loneliness.[20] Evolutionary theory of loneliness suggests that the sense of loneliness motivates individuals to reconnect with others to meet belongingness needs, and then drives off the aversive and provides the positive.[21] Thus, a sense of belonging is not only a precursor to social connectedness but also a buffer against loneliness. Indeed, while reconnection provides individuals ailed with loneliness opportunities to connect to the outside world, grouping provides a wider connectedness to others in society, and group affiliation is conceptualized as a psychological resource contributing to well-being and adjustment.[22] For example, Haslam et al, to address the lack of belonging and social disconnection central to loneliness, examined the efficacy of a novel group intervention, GROUPS 4 HEALTH (G4H), and found that G4H was associated with a greater reduction in symptoms of loneliness and social anxiety.[18]

The Role of Intergroup Contact

Intergroup contact refers to interactions between members of different groups.[23] The development of affiliative ties across group boundaries provides an important vehicle for achieving relational diversity.[24] Intergroup contact and intergroup friendships – the latter being an intimate form of intergroup contact – have been proclaimed as the antidote for reducing many of the negative consequences associated with cross-race interactions,[25] for new relationships afforded by contact with other groups may counteract the negative effect of isolation and loneliness.[26] Specifically, intergroup contact, with its reductive effect on marginalization, perception of exclusion and discrimination, which cause the sense of loneliness and low well-being, helps individuals feel understood by out-group strangers[25] and facilitates psychological and physical well-being in one's daily social interactions.[25,27]

Research evidences of different paradigms showed that intergroup contact may positively relieve loneliness, as both longitudinal and horizontal studies have proved the positive effects of intergroup contact on individual problem-solving, cognitive flexibility, creativity, well-being and mental health in multiple groups, including cross-hukou-regional, ethnic, gender and country.[26,28–36] Specifically, an intergenerational technology program brings disparate age groups together to interact in meaningful activities, resulting in effectively reducing loneliness for older adults.[29] Our hypothesis thus is that intergroup contact may alleviate loneliness.

Common Ingroup Identity as a Mediator

Putnam (2000) referred to contact between dissimilar groups as "bridging social capital" and suggested that intergroup contact allowed for sharing of information, knowledge, and ideas and could generate broader identities.[26,36] According to common ingroup theory, the more positive intergroup contact is, the stronger is the common ingroup identity. Intergroup contact promotes common ingroup identity via three stages: decategorization, salient categorization, and recategorization.[37] During these processes, individuals transform previous single subgroup membership into a high, inclusive level of superordinate group membership, acquiring the sense of shared identity with others and the common ingroup membership as well.

The common ingroup identity may contribute to high value, control, happiness and self-esteem similar to ingroup identity, help individuals to be capable of relieving stress and get support from former outgroup member to improve mental health. Ingroup identity is considered the premise of social connection that provides individuals with psychological resources to cope with setbacks, changes and challenges[38] and reduces loneliness. Group memberships enable people to perceive connection with others through the network of membership relation,[39] enrich people by making them stronger and healthier with self-esteem, belongingness, meaningfulness, and well-being[40] and protect people against

future depression, depression relapse, or alleviating depression symptoms.[41] Furthermore, once individuals identify and learn adaptive behavior norms defined by ingroup, ingroup identification provides them with psychological benefits and supports them from other ingroup members against potential stressors.

Studies have found that when an inclusive social categorization was salient, people were more likely to provide help[42] or take the advice of outgroup.[43,44] A typical common ingroup identity, national identification, was negatively correlated with depression and anxiety and positively correlated with well-being and mental health.[22,45] Additionally, increased community identification was linked to greater perceived social support, community-esteem, personal self-esteem, and self-efficacy. These psychological processes were, in turn, linked to increased resilience and well-being.[46] A study exploring the alleviating effect of community identity on loneliness showed that community identity negatively predicts loneliness and increases individual happiness by reducing loneliness.[11] Thus, we suggest that the effect of intergroup contact on loneliness is similar to the process of social integration that are both meaningful and valuable. Intergroup contact promotes common ingroup identity. Individuals thus can benefit from the superordinate identification, which leads to individual loneliness reduction. To put it in line with the present study, we hypothesize that common ingroup identity may mediate the effects of intergroup contact on loneliness.

Present Study

The goal of the present study is to test the mediating role of common ingroup identity between intergroup contact and loneliness. According to previous studies, estimation bias that exists in cross-sectional mediation analysis can be effectively avoided when mediation analysis of longitudinal data is conducted, and it provides strong evidence for revealing the causal direction and mediation mechanism among variables.[47] For the analyses, we collected the three-wave longitudinal data of freshmen in a Guangxi University, from the enrollment (Time 1) to the 8th month (Time 3).

Based on previous studies, quantity and quality are two aspects of intergroup contact,[48] but quality of intergroup contact has stronger effect than quantity in promoting intergroup help,[49] intergroup attitude,[50] intergroup support,[51] and happiness.[52] Therefore, the current study adopted intergroup contact quality as the measurement of intergroup contact. Above all, we assumed that intergroup contact quality promotes common ingroup identity, and common ingroup identity reduces loneliness. In other words, common ingroup identity may play a mediating role in the process in which intergroup contact quality reduces loneliness.

There are 55 ethnic minorities widely distributed in China. For the size of the population, 5 among the 55 ethnic minorities have their own National Autonomous Regions. The Zhuang is one of the 5 big-size ethnic groups, with a population approximate to 16.93 million, of which 92.88% lives in Guangxi, a southern National Autonomous Region. Zhuang has a long history and a glorious traditional culture, as manifested in the (spoken and written) language, myths, legends, folktales, mural, brocade, drama, ethnomedicine, etc. Zhuang's traditional costume features embroidery, their ethnic jacket, for instance, is well known for the embroidered piping, embroidered waist and embroidered shoes, coming with silver jewellery.

Materials and Methods
Study Design

A longitudinal study was conducted to examine the indirect effect of intergroup contact on loneliness via common ingroup identity. The longitudinal mediation analysis was used to test the mediational model with a longitudinal design for a rigorous inference about the causal relations among intergroup contact, common ingroup identity and loneliness;[53] the Latent Growth Curve Model (LGCM) was used to test the trajectories of intergroup contact, common ingroup identity and loneliness over time in form of variability in the initial levels and the variability in the growth rates among individuals;[54] and the parallel process LGCM mediation analysis was utilized to test the model of growth rate mediation.[53]

Participants

After the exclusion of the missing responses (N = 12), participants available were a total of 538 (51.67% females) Chinese youth between 17 and 22 years of age (mean age = 18.64 years, SD = 0.96) from a university in the

Guangxi Zhuang Autonomous Region in China. Of these, 263 participants are of Han majority living in other provinces before entering the university; 275 participants are of ethnic minority including 123 Zhuang ethnic minority students and 151 other ethnic minority students (e.g. Yao, Dong, Miao) living in Guangxi before entering the university. To examine the potential impact of missing data, we compared the data collected at Time 1 from participants who did and did not participate in measurement at Time 3. The result shows that there were no significant differences in observed variables ($p > 0.05$) between participants who finished three measurements and those who were excluded.

Procedure

Freshmen in the university were invited to participate in the test. We randomly chose 46 classes of freshman year, and then randomly invited students who are of ethnic minority in Guangxi Autonomous Region, China, and those who are majority members but came from other provinces. The assessment was conducted using paper/pencil tests in classrooms. Before the test, students were told that we aimed at gaining a better understanding of their school lives and interpersonal relationships. We stressed the importance of the sincerity of their answers and informed them of their right to refuse to participate and withdraw from the test. Informed consent was obtained from all subjects simultaneously. Following this, participants completed a set of paper-and-pencil questionnaires.

This study involved assessment at three time points, time 1 was in the first week after enrollment of new students in the university, time 2 was in three months after the enrollment, time 3 was in eight months after the enrollment. Participants took about 20 minutes to complete the measurement per time in the presence of researchers, handing in to researchers right after their completion. All assessments were administered by well-trained professionals with psychology background.

Ethical Statements

The current research complies with the Declaration of Helsinki. It was also approved by the human research Scientific Review Committee of Southwest University of the People's Republic of China (H20074).

Measures

The questionnaires used in the study came from published literature, and the two-way translation procedures were adopted to ensure the consistency of content and meaning in both the Chinese and English versions.

Intergroup Contact Quality

The measurement of intergroup contact quality used a five-item scale[55] (eg, for Han sample and the other ethnic minority sample, one of the questions is "When you meet with Zhuang students, in general, do you find the contact to be equal?"). Participants responded to these items on a 7-point Likert scale (from 1 = strongly disagree to 7 = strongly agree). Internal consistencies of the 5-item scale were satisfactory, with Cronbach's alphas 0.95 at T1, 0.94 at T2, and 0.94 at T3, respectively. The results of CFA indicated that structural validity of the model was acceptable in the first wave (χ^2/df = 1.52, CFI = 0.99, TLI = 0.98, RMSEA = 0.03, SRMR = 0.005), the second wave (χ^2/df = 3.72, CFI = 0.99, TLI = 0.99, RMSEA = 0.07, SRMR = 0.007), and the third wave (χ^2/df = 2.22, CFI = 0.99, TLI = 0.99, RMSEA = 0.05, SRMR = 0.006).

Common Ingroup Identity

We measured common ingroup identity with an item adapted from previous research.[56] Participants rated the extent of agreement with the statement: "our ethnic group and Zhuang share a common group" (1 = strongly disagree; 7 = strongly agree).

Loneliness

Loneliness was measured using a brief R-UCLA Loneliness Scale.[57] There were three items, such as "I feel left out" (from 1 = strongly disagree to 7 = strongly agree). The internal consistencies of three waves were 0.914, 0.921, and 0.937, respectively. The results of CFA indicated that structural validity of the model was saturated model in three wave, indicating that they perfectly fit the data.

Covariant

The number of friends is used as the control variable. There was one item to ask how many Zhuang friends do you have at the three points[52] (1 = 0, 2 = 3, 3 = 3–5, 4 = 6–10, 5 = 10–30, 6 = more than 30).

Statistical Analysis

Descriptive statistics and correlation analysis were calculated for each variable. Next, we established the model with the intergroup contact quality at T1 as the independent variable, common ingroup identity at T2 as the mediator, loneliness at T3 as the dependent variable, and the number of friends as the control variable of independent variable and the dependent variable, the product of coefficients of two paths as the test of indirect effect. The significance of the indirect effects was evaluated using the bootstrap procedure (5000 draws). The expressions are following:

$$X_{t+1} = \beta_x \, X_t + \varepsilon_{x(t+1)} \tag{1}$$

$$M_{t+1} = \beta_M M_t + aX_t + \varepsilon_{M(t+1)} \tag{2}$$

$$Y_{t+2} = \beta_Y Y_{t+1} + bM_{t+1} + \varepsilon_{Y(t+2)} \tag{3}$$

In (1), (2) and (3), *X, M, Y* refer to independent variable, mediated variable, and dependent variable, respectively, β_x, β_M and β_Y refer to autoregressive effect, a and b refer to lag effect, the product of a and b refers to indirect effect, ε refers to residual, and t, t+1 and t+2 refer to time point that repeat measured.

Although the longitudinal design approach is one of the analytical strategies for determining the directionality of effects between variables, repeated measurement of variables in a longitudinal design introduces additional within-person variability. In order to ensure methodological precision, we also used Latent Growth Curve Model (LGCM), which captures the collection of individual trajectories over time in the form of fixed and random effects[58] to estimate the individual variation and group variation in the development process at the same time (Figure 1). LGCM of every variable has an average initial status α and an average growth rate *S*. The variances of the intercept and the slope factors estimate the variability in the initial levels and the variability in the growth rates among individuals.[53]

As shown in Figure 1, V1, V2 and V3 are the values of three repeated measurements. E1, E2 and E3 are the random measurement errors at three time points. The two variables enclosed in circles represent the unobserved Intercept and
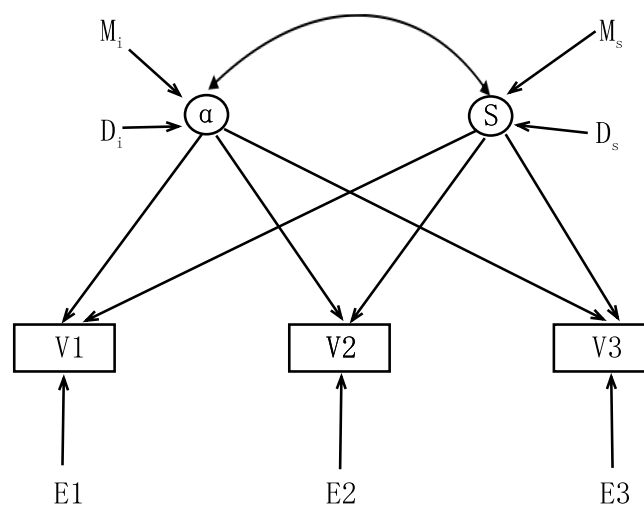

Figure 1 Diagram of Latent growth curve model. V1, V2 and V3 are the values of three repeated measurements, E1, E2 and E3 are the random measurement errors at three time points. *α* and *S* enclosed in circles represent the unobserved Intercept and Slope factors respectively; M_i and D_i are the mean and variance of the unobserved Intercept factor, M_S and D_S are the mean and variance of the unobserved Slope factor.

Slope factors.[59] The two factors both have a mean (M) and variance (D) across the whole sample.[58] The expressions are following:

$$\alpha = \mu_{intercept} + \zeta 0 \qquad (4)$$

$$S = \mu_{slope} + \zeta 1 \qquad (5)$$

where α refers to intercept, S refers to slope, μ refers to mean, ζ refers to variance.

Thus, we conducted the LGCM of every variable, and then built a parallel process LGCM based on the longitudinal mediation model. By setting regression equations among growth factors, we can better reveal the trajectory of intergroup contact quality, common ingroup identity and loneliness, and relationship among them.

Results

Correlation Analysis

Means, standard deviations, and intercorrelations for intergroup contact quality, common ingroup identity, loneliness at each wave of measurement are presented in Table 1. An inspection of the means and variability reveals highly stability. At the three points, the quality of intergroup contact was significantly positively correlated with common ingroup identity, and significantly negatively correlated with loneliness. Common ingroup identity was significantly negatively correlated with loneliness.

Longitudinal Mediation Analysis

Taking the number of friends as the covariate of loneliness and intergroup contact quality, we tested the indirect effect of common ingroup identity between intergroup contact quality and loneliness (Figure 2). The results showed that the model fitted well, $\chi^2 = 136.99$, df = 39, CFI = 0.94, TLI = 0.90, RMSEA = 0.07, SRMR = 0.07. The quality of intergroup contact significantly positively predicted common ingroup identity at T2, and common ingroup identity at T2 significantly negatively predicted loneliness at T3. The indirect effect of intergroup contact quality at T1 on loneliness at T3 through common ingroup identity at T2 was significant as the bias corrected 95% confidence intervals was [−0.046, −0.006], the indirect effect did not include zero.

Table 1 Descriptive Statistics and Correlation of Intergroup Contact Quality, Common Ingroup Identity and Loneliness

Variable	Mean	SD	1	2	3	4	5	6	7	8
1.T1 ICQ	5.89	1.02	–							
2.T2 ICQ	5.98	0.93	0.60***	–						
3.T3 ICQ	6.01	0.90	0.51***	0.58***	–					
4.T1 CII	6.09	1.24	0.33***	0.26***	0.25***	–				
5.T2 CII	5.98	1.13	0.28***	0.39***	0.29***	0.43***	–			
6.T3 CII	5.99	1.13	0.28***	0.36***	0.41***	0.33***	0.45***	–		
7.T1 Loneliness	3.01	1.36	−0.30***	−0.28***	−0.18***	−0.20***	−0.16***	−0.12**	–	
8. T2 Loneliness	2.93	1.36	−0.34***	−0.40***	−0.30***	−0.18***	−0.19***	−0.17***	0.56***	–
9.T3 Loneliness	2.72	1.32	−0.30***	−0.35***	−0.38***	−0.16***	−0.23***	−0.20***	0.46***	0.61***

Notes: **p<0.01, ***p<0.001. T1, T2, T3 are points-in-time that variables are measured; SD, standard deviation.
Abbreviations: ICQ, intergroup contact quality; CII, common ingroup identity.
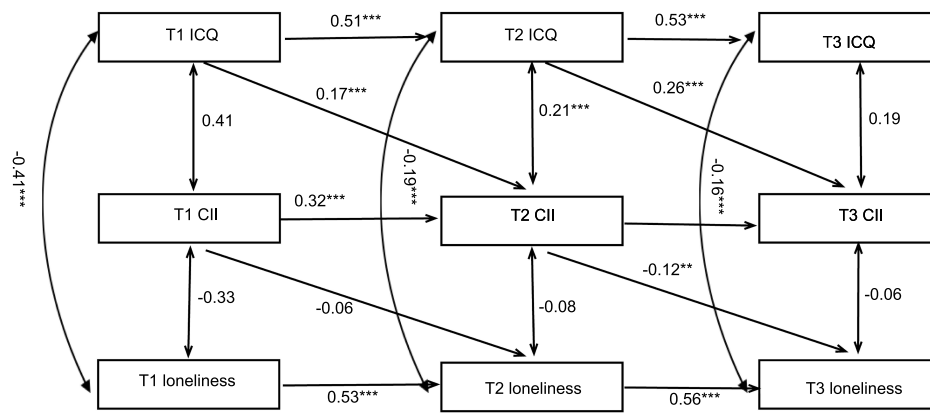
Figure 2 Longitudinal mediation model.
Notes: All parameter estimates in the figure are unstandardized results. The control variable is not shown in the figure.

Parallel Process LGCM for Mediation Analysis

In order to test trajectories of intergroup contact, common ingroup identity and loneliness over time, we constructed no-growth model and unconditional linear growth model for every variable. The goodness of fit of the models for each variable is shown in Table 2. The results showed that the goodness of linear growth models was better for all three variables. The initial value and rate of change for each variable are shown in Table 3.

The model fit of intergroup contact quality was good, $\chi^2 = 2.96$, df = 1, CFI = 1.00, TLI = 0.99, RMSEA = 0.05, SRMR = 0.01. The mean of intercept factor was 5.91, $SE = 0.04$, $p < 0.001$, the mean of slope factor was 0.01, $SE = 0.01$, $p < 0.01$. The variation of intercept factor was greater than zero ($\sigma^2 = 0.63$, $SE = 0.06$, $p < 0.001$), indicating that there was significant individual difference on the initial level of contact quality, and the variation of slope factor was marginal significant ($\sigma^2 = 0.003$, $SE = 0.002$, $p > 0.05$).

Table 2 Comparisons of Fitted Growth Curve Models for the Variables

Variables	Models	χ^2	*df*	CFI	TLI	RMSEA	SRMR
Intergroup contact quality	No-growth model	32.66	6	0.95	0.97	0.09	0.23
	Linear growth model	2.96	1	1.00	0.99	0.05	0.01
Common ingroup identity	No-growth model	10.31	3	0.97	0.97	0.07	0.06
	Linear growth model	2.26	1	1.00	0.98	0.05	0.02
Loneliness	No-growth model	13.46	6	0.97	0.98	0.07	0.06
	Linear growth model	0.24	1	1.00	1.00	0.00	0.01

Abbreviations: χ^2, chi-square test; *df*, degree of freedom; CFI, comparative fit index; TLI, Tucker-Lewis index; RMSEA, root-mean-square error of approximation; SRMR, standardized root mean square residual.

Table 3 Estimate of Univariate LGCM

Variables	Intercept		Slope		Covariances
	Mean	Variances	Mean	Variances	
Intergroup contact quality	5.91	0.63	0.01	0.003	−0.46
Common ingroup identity	5.65	0.67	0.02	0.01	−0.36
Loneliness	3.02	1.14	−0.04	0.02	−0.29

The correlation between intercept and slope was significant ($r = -0.46$, $p < 0.001$), indicating that the higher the initial contact quality of individuals, the slower the growth speed of their contact quality.

There was no significant change except for mean slope and variation of slope factor when controlled the number of friends. Specially, the mean of intercept factor of contact quality was 5.91, $SE = 0.074$, $p < 0.001$, the mean of slope factor was 0.01, $SE = 0.005$, $p < 0.01$. The variation of intercept was greater than zero ($\sigma^2 = 0.62$, $SE = 0.06$, $p < 0.001$), the variation of slope was insignificant ($\sigma^2 = 0.003$, $SE = 0.002$, $p > 0.05$). The correlation between intercept and slope is significant ($r = -0.02$, $p < 0.01$).

The model fit of unconditional LGCM for common ingroup identity was good, $\chi^2 = 2.26$, df = 1, CFI = 1.00, TLI = 0.98, RMSEA = 0.05, SRMR = 0.02. The mean of intercept factor of common ingroup identity was 6.06, $SE = 0.51$, $p < 0.001$. The mean of slope factor was -0.01, $SE = 0.09$, $p = 0.17$. The variation of intercept factor was greater than zero ($\sigma^2 = 0.67$, $SE = 0.09$, $p < 0.001$), indicating that there was significant individual difference at the initial level of common ingroup identity. The variation of slope factor was significant ($\sigma^2 = 0.01$, $SE = 0.01$, $p<0.05$). The correlation between intercept and slope was significant ($r = -0.36$, $p < 0.001$), indicating that the higher the initial common ingroup identity of individuals is, the slower is the growth speed of common ingroup identity.

Finally, we tested the developmental trajectories of loneliness. The model fitted well, $\chi^2 = 0.24$, df = 1, CFI = 1.00, TLI = 1.00, RMSEA = 0.00, SRMR = 0.01. The mean of intercept factor of loneliness was 3.02, $SE = 0.15$, $p < 0.001$, the mean of slope factor was -0.04, $SE = 0.07$, $p < 0.001$. Both of the variation of intercept ($\sigma^2 = 1.14$, $SE = 0.17$, $p < 0.001$) and slope factors ($\sigma^2 = 0.02$, $SE = 0.01$, $p < 0.001$) were significant. The correlation between intercept and slope was significant ($r = -0.29$, $p < 0.001$), indicating that the higher the initial loneliness of individuals is, the slower is the growth rates of loneliness. The mean and variation of intercept factor and slope factor remained significant when controlled for the number of friends.

The independent variable LGCM, mediator LGCM and outcome variable LGCM are combined to establish a parallel process latent growth model for mediation, including the initial level mediation ($\alpha_X \rightarrow \alpha_M \rightarrow \alpha_Y$) and growth rate mediation ($S_X \rightarrow S_M \rightarrow S_Y$).[47] Based on the longitudinal mediation model, we conducted the parallel process LGCM mediation analysis. Because we were interested in relations among slope of three variables, we only test the model of growth rate mediation. To investigate indirect effects of growth rates not confounded by initial differences between subjects, associations between intercept factors and slope factors in variables were also added as controls. The model is shown in Figure 3. The model fitted well, $\chi^2 = 106.10$, df = 45, CFI = 0.96, TLI = 0.94, RMSEA = 0.05, SRMR = 0.05. The path coefficients are shown in Table 4. The slope of intergroup contact quality significantly positively predicted the slope of group identity within the community, $B = 1.10$, 95% CI [0.37, 2.96], the slope of common ingroup identity negatively predicts the slope of loneliness, $B = -1.37$, 95% CI [-3.31, -0.11], the 95% confidence interval of indirect effect was [-3.83, -0.21], did not include zero.

Additional Analysis

Based on the longitudinal mediation analysis, we explored differences between minority ethnic students and majority ethnic students and focused on the differences of paths that from contact quality at T1 to common ingroup identity at T2 and from common ingroup identity at T2 to loneliness at T3 and longitudinal mediation. The results showed (Table 5) that the difference of path coefficients and indirect effect between two groups were not significant.

Discussion

In the present study, we conducted a longitudinal study to examine the relation among intergroup contact, common ingroup identity and loneliness. The results showed that intergroup contact could alleviate individual loneliness via promoting common ingroup identity. Furthermore, the growth rate of the quality of intergroup contact can increase the growth rate of common ingroup identity, resulting in reducing the growth rate of loneliness.

Satisfying social relationships are vital for one's mental and physical health. At the individual level, satisfying interpersonal relationships with others can promote mental and physical health.[60] At the group level, positive intergroup contact can also promote mental health, reduce the impact of stress on individuals and eliminate negative emotions, because positive intergroup contact can create similarity and then weaken the salience of group boundaries,[61] generate
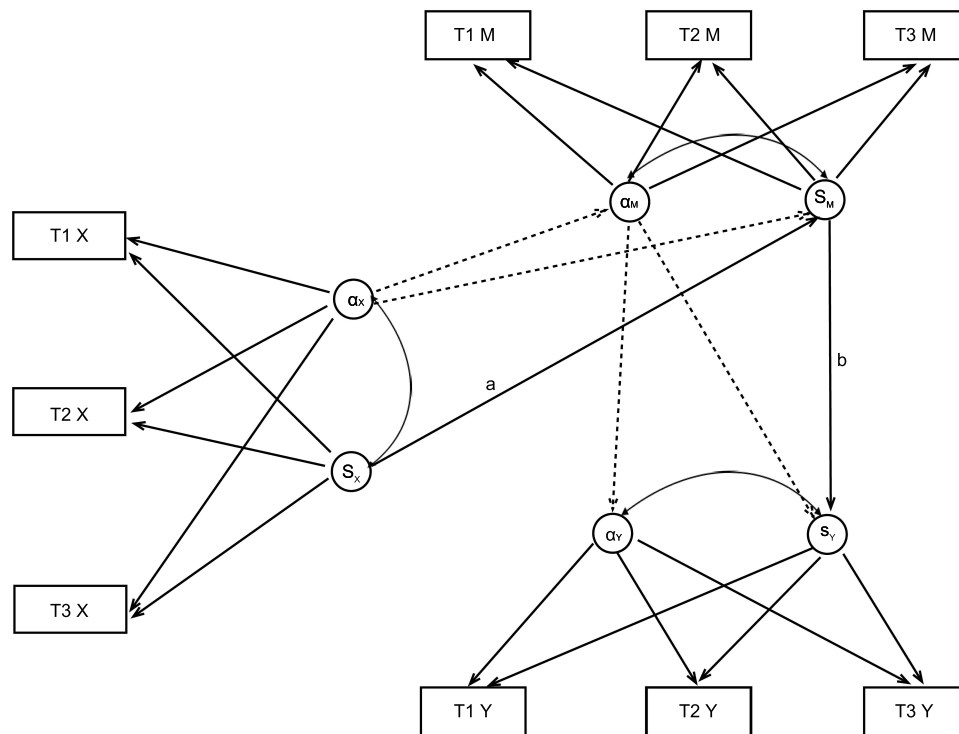
Figure 3 Parallel process LGCM for mediation.
Notes: X is independent variable (ingroup contact quality); M is mediator (common ingroup identity); Y is outcome (loneliness). T1, T2, T3 are points-in-time that variables are measured. αx is intercept (initial status) factor of independent variable, αM is intercept (initial status) factor of mediator; αY is intercept (initial status) factor of outcome; SX is slope (growth rate) factor of independent variable; SM is slope (growth rate) factor of mediator; SY is slope (growth rate) factor of outcome. a is the effect of SX on SM, b is the effect of SM on SY. The dotted lines in the figure indicate that associations between intercept and intercept, slope and intercept were controlled.

broader identities,[62] reduce intergroup anxiety,[63] provide the knowledge and information,[64] provide social support[64,65] and a sense of social integration and belongingness;[66] longitudinally predict less social distance and more prosocial behavior.[67] Lonely individuals are more prosocial in the public situation that they can gain appreciation and a reputation,

Table 4 Standardized Beta Coefficients, and Indirect Effect with 95% Bootstrap Confidence for Parallel Process LGCM

Paths	Estimator	95% CI
ICQ slope→CII slope(a)	1.10	[0.37, 2.96]
CII slope→Loneliness slope(b)	−1.37	[−3.31,-0.11]
ICQ slope→CII slope→Loneliness slope(a×b)	−1.50	[−3.83,-0.21]

Note: 95% CI is 95% confidence intervals.
Abbreviation: ICQ is intergroup contact quality; CII is common ingroup identity.

Table 5 Longitudinal Mediation Comparison of Two Groups

Paths	Minority		Majority		Comparison
	Estimator	95% CI	Estimator	95% CI	
T1 ICQ→T2 CII(a)	0.19	[0.05, 0.28]	0.17	[0.05, 0.25]	0.02
T2 CII→T3 loneliness(b)	−0.14	[−0.21, −0.02]	−0.10	[−0.18, 0.00]	−0.04
T1 CQ→T2 CII→T3 loneliness(a×b)	−0.03	[−0.07, −0.01]	−0.02	[−0.04, −0.002]	−0.01

Notes: T1, T2, T3 are points-in-time that variables are measured. 95% CI is 95% confidence intervals.
Abbreviations: ICQ, intergroup contact quality; CII, common ingroup identity.

because they have a motivation to reconnect,[68] and prosocial behaviors can establish or enhance one's relational value or attachment with others, which may resolve loneliness.[19] Similarly, close social distance and social touch provide an opportunity for them to reconnect with our social network, and thus reduce loneliness.[69] In addition, the higher the quality of group contact, the more likely are the individuals to form friendships with previous outgroup members. Cross-group friendships promote common ingroup identity through social integration,[70] and common ingroup identity provides group membership and promotes the sense of belonging, which helps receiving greater numbers of ingroup support,[46] thereby reducing loneliness.[45] The positive effect of common ingroup identity is to be expected because individuals are more likely to provide social support to ingroup than outgroup members and are more likely to accept help from ingroup members.[71] At the same time, increasing social activity, specifically through acquiring group memberships, may be a vital, curative ingredient in the treatment of loneliness.

The present study expands our knowledge about the individual-level effect of intergroup contact. As a group process, intergroup contact acts on various group psychology and behavior, such as the reduction of intergroup prejudice, and the improvement of intergroup relation and attitude.[72] Nevertheless, a small amount of study found individual-level effect of intergroup contact, such as its positive effects on psychological capital for individuals, its provision of social support, and increasing effect on well-being.[36] However, how intergroup contact works on reducing negative emotions at individual level is not fully understood. We found the impact of intergroup contact on loneliness, which expands our understanding about the individual-level effect of intergroup contact except for well-being, expanding intergroup contact theory, providing evidence for relation between intergroup and individual psychological process, and also contributing to further understanding the connection between group psychological and individual psychological processes.

The findings of the present study provide new evidence for social cure of social identity. Group is a valued factor working on individual mental health. Based on the group identity approach, group identity affects individual mental well-being via self-esteem,[73] social support,[74] control perception and attribution style. The social cure of social identity puts forward the positive meaning of group membership[41] and multiple group identification[71,75] for individual mental health and social adaptation, because different groups provide different types of social support. The study found that a higher, more inclusive superordinate group identification has a positive effect on relieving loneliness.

The results of the parallel process LGCM for mediation analysis showed that the growth rate of the quality of intergroup contact increased the growth rate of common ingroup identity and then reduced the growth rate of loneliness. This dynamic result pattern suggests that we should pay more attention to the growth rate of contact quality in the process of group-based interventions on loneliness and the pattern provides a fresh perspective that we should be more active and sincere when contact with others. In the future, we could explore other effective methods to improve the quality of intergroup contact and the effectiveness of these methods to reduce loneliness of mobile groups, such as cross-group friendship, intergroup attitude, amongst others. In addition, ERP and fMRI can also be used to investigate the neural relationship between intergroup contact and loneliness.

Contributions and Limitations

The current study has some contributions as following. It extends the individual-level effect of intergroup contact, as well as the individual-level effect of common ingroup identity. They jointly contribute to the alleviation of individual loneliness. This increases our knowledge about the "social cure" and the health benefits that originally arise from ingroup processes, with the indication that this benefit can be expanded by intergroup contact including former outgroup members. Meanwhile, our knowledge is also expanded to the dynamic development process among intergroup contact, common ingroup identity and loneliness, ie, the faster intergroup contact quality develops, the more common ingroup identity generates and the lower loneliness people would experience.

Despite these contributions, there are several limitations to be addressed for future studies. Although the parallel process LGCM for mediation is based on measurements at three different time points, the time durations are relatively short; therefore, it provides suggestions for short-term interventions only and cannot provide further detailed evidences for the developmental trajectories of intergroup contact for a longer time. A study on the developmental trajectories of loneliness by Liu et al, followed up for three years, found a nonlinear growth pattern of loneliness.[76] Therefore, future researches may establish a nonlinear LGCM by extending the tracking time so as to comprehensively explore the long-term relationships

among the three. With previous studies indicating that contact quantity is also effective in improving intergroup relations,[77] for a better understanding of the relationship between intergroup contact and loneliness, more research efforts need to be made on how intergroup contact quantity alleviates loneliness. In addition, individual factors such as "The Big Five", political orientations and social dominance orientation should also be taken account of in our future studies, because according to the concepts of situational evocation, social investment theory, and self-perception theory, intergroup contact and individual traits are bidirectionally associated.[78] What worth mentioning is that this study used self-report questionnaires, which are subject to social desirability bias. In future research, more and various measuring tools need to be employed; peer nominations, for instance, are to be employed to examine the role played by intergroup contact in alleviating loneliness via common ingroup identity. Last, but not the least, loneliness is also found to be related to suicidal behavior,[79] which is in turn frequently related to depressive symptoms,[80] and explorations on the effect of intergroup contact on those two are thus especially needed in our future studies.

Implications and Conclusion

The findings in the present study suggest that intergroup contact quality alleviates loneliness via common ingroup identity. Furthermore, the growth rate of the quality of intergroup contact can increase the growth rate of common ingroup identity, resulting in reducing the growth rate of loneliness. It has implications for prevention and intervention for cross-cultural transition, communication in multi-ethnic or multi-racial countries. For individuals, it is beneficial to reducing loneliness by intergroup contact and then constructing common identity with former outgroup members. One could join certain groups to get memberships, take part in intergroup activities with a positive attitude and full sincerity. For groups, building platforms for group members to alleviate loneliness and get health and well-being by organizing intergroup events and activating common ingroup identity between ingroup and outgroup in the process would be an important contribution for constructing harmonious society.

Abbreviation

LGCM, latent growth curve model.

Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

Disclosure

The authors report no conflicts of interest in this work.

References

1. Lodder GMA, Goossens L, Scholte RHJ, Engels RC, Verhagen M. Adolescent loneliness and social skills: agreement and discrepancies between self-, meta-, and peer-evaluations. *J Youth Adolesc*. 2016;45(12):2406–2416. doi:10.1007/s10964-016-0461-y

2. Stavrova O, Ren D, Pronk T. Low self-control: a hidden cause of loneliness? *Pers Soc Psychol Bull*. 2021;48:347–362. doi:10.1177/01461672211007228

3. Cacioppo S, Capitanio JP, Cacioppo JT. Toward a neurology of loneliness. *Psychol Bull*. 2014;140(6):1464–1504. doi:10.1037/a0037618

4. Masi CM, Chen H, Hawkley LC, Cacioppo JT. A Meta-Analysis of interventions to reduce loneliness. *Pers Soc Psychol Rev*. 2011;15(3):219–266. doi:10.1177/1088868310377394

5. Hawkley LC, Cacioppo JT. Loneliness matters: a theoretical and empirical review of consequences and mechanisms. *Ann Behav Med*. 2010;40(2):218–227. doi:10.1007/s12160-010-9210-8

6. Landeiro F, Barrows P, Nuttall Musson E, Gray AM, Leal J. Reducing social isolation and loneliness in older people: a systematic review protocol. *BMJ Open*. 2017;7(5):e13778. doi:10.1136/bmjopen-2016-013778

7. Haslam C, Haslam SA, Jetten J, Cruwys T, Steffens NK. Life change, social identity, and health. *Annu Rev Psychol*. 2021;72(1):635–661. doi:10.1146/annurev-psych-060120-111721

8. Qualter P, Vanhalst J, Harris R, et al. Loneliness across the life span. *Perspect Psychol Sci*. 2015;10(2):250–264. doi:10.1177/1745691615568999

9. Vanhalst J, Soenens B, Luyckx K, et al. Why do the lonely stay lonely? Chronically lonely adolescents' attributions and emotions in situations of social inclusion and exclusion. *J Pers Soc Psychol*. 2015;109(5):932–948. doi:10.1037/pspp0000051

10. Goodfellow C, Hardoon D, Inchley J, et al. Loneliness and personal well-being in young people: moderating effects of individual, interpersonal, and community factors. *J Adolesc*. 2022;94(4):554–568. doi:10.1002/jad.12046

11. Mcnamara N, Stevenson C, Costa S, et al. Community identification, social support, and loneliness: the benefits of social identification for personal well-being. *Br J Soc Psychol*. 2021;60(4):1379–1402. doi:10.1111/bjso.12456

12. Hajek A, Kretzler B, König HH. Multimorbidity, Loneliness, and Social Isolation. A systematic review. *Int J Environ Res Public Health*. 2020;17(22):8688. doi:10.3390/ijerph17228688

13. Donovan NJ, Wu Q, Rentz DM, Sperling RA, Marshall GA, Glymour MM. Loneliness, depression and cognitive function in older U.S. adults. *Int J Geriatr Psychiatry*. 2017;32(5):564–573. doi:10.1002/gps.4495

14. Zhong BL, Chen SL, Conwell Y. Effects of transient versus chronic loneliness on cognitive function in older adults: findings from the Chinese longitudinal healthy longevity survey. *Am J Geriatr Psychiatry*. 2016;24(5):389–398. doi:10.1016/j.jagp.2015.12.009

15. Cacioppo JT, Hawkley LC, Thisted RA. Perceived social isolation makes me sad: 5-year cross-lagged analyses of loneliness and depressive symptomatology in the Chicago health, aging, and social relations study. *Psychol Aging*. 2010;25(2):453–463. doi:10.1037/a0017216

16. Vanhalst J, Luyckx K, Raes F, Goossens L. Loneliness and depressive symptoms: the mediating and moderating role of uncontrollable ruminative thoughts. *J Psychol*. 2012;146(1–2SI):259–276. doi:10.1080/00223980.2011.555433

17. Wei M, Roodenrys S, Miller L. Attentional bias for threat and anxiety: the role of loneliness. *Psychiatry*. 2020;83(3):278–291. doi:10.1080/00332747.2020.1762400

18. Haslam C, Cruwys T, Chang MXL, et al. GROUPS 4 HEALTH reduces loneliness and social anxiety in adults with psychological distress: findings from a randomized controlled trial. *J Consult Clin Psychol*. 2019;87(9):787–801. doi:10.1037/ccp0000427

19. Spithoven A, Bijttebier P, Goossens L. It is all in their mind: a review on information processing bias in lonely individuals. *Clin Psychol Rev*. 2017;58:97–114. doi:10.1016/j.cpr.2017.10.003

20. Baumeister RF, Leary MR. The need to belong: desire for interpersonal attachments as a fundamental human motivation. *Psychol Bull*. 1995;117:497–529. doi:10.1037//0033-2909.117.3.497

21. Cacioppo JT, Hawkley LC, Ernst JM, et al. Loneliness within a nomological net: an evolutionary perspective. *J Res Pers*. 2006;40(6):1054–1085. doi:10.1016/j.jrp.2005.11.007

22. Sher-Censor E, Benish-Weisman M, Gal L, Karni S. The associations between national identity and adjustment: what can we learn from autobiographical narratives? *Int J Intercult Relat*. 2018;67:12–24. doi:10.1016/j.ijintrel.2018.08.003

23. Mckenna S, Lee E, Klik KA, Markus A, Hewstone M, Reynolds KJ. Are diverse societies less cohesive? Testing contact and mediated contact theories. *PLoS One*. 2018;13(3):e193337. doi:10.1371/journal.pone.0193337

24. Mendoza-Denton R, Page-Gould E. Can cross-group friendships influence minority students' well-being at historically white universities? *Psychol Sci*. 2008;19(9):933–939. doi:10.1111/j.1467-9280.2008.02179.x

25. Shelton N, Douglass S, Garcia RL, Yip T, Trail TE. Feeling (mis)understood and intergroup friendships in interracial interactions. *Pers Soc Psychol Bull*. 2014;40(9):1193–1204. doi:10.1177/0146167214538459

26. Tip LK, Brown R, Morrice L, Collyer M, Easterbrook MJ. Improving refugee well-being with better language skills and more intergroup contact. *Soc Psychol Personal Sci*. 2019;10(2):144–151. doi:10.1177/1948550617752062

27. Lun J, Kesebir S, Oishi S. On feeling understood and feeling well: the role of interdependence. *J Res Pers*. 2008;42(6):1623–1628. doi:10.1016/j.jrp.2008.06.009

28. Hodson G, Crisp RJ, Meleady R, Earle M. Intergroup contact as an agent of cognitive liberalization. *Perspect Psychol Sci*. 2018;13(5):523–548. doi:10.1177/1745691617752324

29. Juris JJ, Bouldin ED, Uva K, Cardwell CD, Schulhoff A, Hiegl N. Virtual intergenerational reverse-mentoring program reduces loneliness among older adults: results from a pilot evaluation. *Int J Environ Res Public Health*. 2022;19(12):7121. doi:10.3390/ijerph19127121

30. Liu C, Zhou S, Bai X. Intergenerational relationship quality, sense of loneliness, and attitude toward later life among aging Chinese adults in Hong Kong. *Front Psychol*. 2022;13. doi:10.3389/fpsyg.2022.930857

31. Bagci SC, Turnuklu A, Bekmezci E. Cross-group friendships and psychological well-being: a dual pathway through social integration and empowerment. *Br J Soc Psychol*. 2018;57(4):773–792. doi:10.1111/bjso.12267

32. Ward C, Masgoret A. Cultural identification, contact, and psychological adaptation: examining the functional role of loneliness in predicting sojourner depression. Ongoing themes in psychology and culture: Proceedings from the 16th International Congress of the International Association for Cross-Cultural Psychology; 2004.

33. Eller A, Cakal H, Sirlopu D. Identity, contact, and health among majority and minority ethnic groups in Mexico and Chile. In: *Understanding Peace and Conflict Through Social Identity Theory*. Springer; 2016. doi:10.1007/978-3-319-29869-6_19

34. Zhou X, Li J, Wang Q. Making best friends from other groups and mental health of Chinese adolescents. *Youth Soc*. 2022;54(1):123–147. doi:10.1177/0044118X20959222

35. Bagci SC, Turnuklu A, Bekmezci E. The buffering role of in-group identification and intergroup contact on the association between perceived discrimination and mental health. *J Community Appl Soc Psychol*. 2018;28(5):293–305. doi:10.1002/casp.2357

36. Marinucci M, Mazzoni D, Pancani L, Riva P. To whom should I turn? Intergroup social connections moderate social exclusion's short- and long-term psychological impact on immigrants. *J Exp Soc Psychol*. 2022;99:104275. doi:10.1016/j.jesp.2021.104275

37. Gaertner SL, Dovidio JF, Anastasio PA, Bachman BA, Rust MC. The common ingroup identity model: recategorization and the reduction of intergroup bias. *Eur Rev Soc Psychol*. 1993;1(4):1–26. doi:10.1080/14792779343000004

38. Wang Q, Yu GL. The relationship between group identification and individual mental health: moderating variables and mechanisms. *Adv Cogn Psychol*. 2016;24(8):1300–1308. doi:10.3724/SP.J.1042.2016.01300

39. Alcover C, Rodríguez F, Pastor Y, Thomas H, Rey M, Del Barrio JL. Group membership and social and personal identities as psychosocial coping resources to psychological consequences of the COVID-19 confinement. *Int J Environ Res Public Health*. 2020;17(20):7413. doi:10.3390/ijerph17207413

40. Greenaway KH, Cruwys T, Haslam SA, Jetten J. Social identities promote well-being because they satisfy global psychological needs. *Eur J Soc Psychol*. 2016;46(3):294–307. doi:10.1002/ejsp.2169

41. Cruwys T, Dingle GA, Haslam C, Haslam SA, Jetten J, Morton TA. Social group memberships protect against future depression, alleviate depression symptoms and prevent depression relapse. *Soc Sci Med*. 2013;98:179–186. doi:10.1016/j.socscimed.2013.09.013

42. Levine M, Prosser A, Evans D, Reicher S. Identity and emergency intervention: how social group membership and inclusiveness of group boundaries shape helping behavior. *Pers Soc Psychol Bull*. 2005;36(1):3–4. doi:10.1177/0146167209355127

43. Stevenson C, Sagherian-Dickey T. Collectively coping with contact: the role of intragroup support in dealing with the challenges of intergroup mixing in residential contexts. *Br J Soc Psychol*. 2016;55(4):681–699. doi:10.1111/bjso.12150

44. Sun T, Liang FM, Zhao YF. The mechanism of promotion effect of common ingroup identity on group help. *Chin Soc Psychol Rev*. 2019;2:16–33.

45. Bonetto E, Delouvée S, Mahfud Y, Adam-Troian J. National identification, a social cure for COVID-19? Evidence from 67 countries. *Int J Soc Psychiatry*. 2022;68(5):1116–1126. doi:10.1177/00207640211020036

46. Heath SC, Rabinovich A, Barreto M. Putting identity into the community: exploring the social dynamics of urban regeneration. *Eur J Soc Psychol*. 2017;47(7):855–866. doi:10.1002/ejsp.2296

47. Fang J, Wen ZL, Qiu HZ. Mediation analysis of longitudinal data. *J Psychol Sci*. 2021;44(4):989–996. doi:10.16719/j.cnki.1671-6981.20210431

48. Yu D, Zhao Y, Yin C, Liang F, Chen W, Network A. Analysis of the association between intergroup contact and intergroup relations. *Psychol Res Behav Manag*. 2022;15:51–69. doi:10.2147/PRBM.S336740

49. Johnston BM, Glasford DE. Intergroup contact and helping: how quality contact and empathy shape outgroup helping. *Group Process Intergroup Relat*. 2018;21(8):1185–1201. doi:10.1177/1368430217711770

50. Merrilees CE, Taylor LK, Baird R, Goeke-Morey MC, Shirlow P, Cummings EM. Neighborhood effects of intergroup contact on change in youth intergroup bias. *J Youth Adolesc*. 2018;47(1):77–87. doi:10.1007/s10964-017-0684-6

51. Firat M, Ataca B. Does perceived cultural distance mediate the relationship between intergroup contact and support for refugee rights? A preliminary investigation. *J Community Appl Soc Psychol*. 2022;32(1):57–72. doi:10.1002/casp.2536

52. Song XX, Xin ZQ. The relationship of intergroup contact and happiness of migrant elderly people and local elderly people. *Psychol Devel Educ*. 2019;35(5):615–623. doi:10.1618/j.cnkiissn1001-4918.2019.05.13

53. Cheong J. Accuracy of estimates and statistical power for testing meditation in latent growth curve modeling. *Struct Equ Modeling*. 2011;18(2):195–211. doi:10.1080/10705511.2011.557334

54. Cole DA, Maxwell SE. Testing mediational models with longitudinal data: questions and tips in the use of structural equation modeling. *J Abnorm Psychol*. 2003;112(4):558–577. doi:10.1037/0021-843X.112.4.558

55. Islam MR, Hewstone M. Dimensions of contact as predictors of intergroup anxiety, perceived out-group variability, and out-group attitude: an integrative model. *Pers Soc Psychol Bull*. 1993;19(6):700–710. doi:10.1177/01461672931960053

56. Eller A, Abrams D, Koschate M. Can stateways change folkways? Longitudinal tests of the interactive effects of intergroup contact and categorization on prejudice. *J Exp Soc Psychol*. 2017;72:21–31. doi:10.1016/j.jesp.2017.04.005

57. Hughes ME, Waite LJ, Hawkley LC, Cacioppo JT. A short scale for measuring loneliness in large surveys. *Res Aging*. 2004;26(6):655–672. doi:10.1177/0164027504268574

58. Duncan TE, Duncan SC. The ABC's of LGM: an introductory guide to latent variable growth curve modeling. *Soc Personal Psychol Compass*. 2009;3(6):979–991. doi:10.1111/j.1751-9004.2009.00224.x

59. Byrne BM, Crombie G. Modeling and testing change: an introduction to the Latent Growth Curve Model. *Under Stat*. 2003;2(3):177–203. doi:10.1207/S15328031US0203_02

60. Heinrich LM, Gullone E. The clinical significance of loneliness: a literature review. *Clin Psychol Rev*. 2006;26(6):695–718. doi:10.1016/j.cpr.2006.04.002

61. Munniksma A, Verkuyten M, Flache A, Stark TH, Veenstra R. Friendships and outgroup attitudes among ethnic minority youth: the mediating role of ethnic and host society identification. *Int J Intercult Relat*. 2015;44(44):88–99. doi:10.1016/j.ijintrel.2014.12.002

62. Putnam R. *Bowling Alone: Collapse and Revival of American Community*. New York, NY: Simon & Schuster; 2000.

63. Zagefka H, Gonzalez R, Brown R, Lay S, Manzi J, Didier N. To know you is to love you: effects of intergroup contact and knowledge on intergroup anxiety and prejudice among indigenous Chileans. *Int J Psychol*. 2017;52(4):308–315. doi:10.1002/ijop.12229

64. Suter B, Magnusson K. *Resettled and Connected? Social Networks in the Integration Process of Resettled Refugees*. Malmo, Sweden: Holmbergs; 2015.

65. Strang AB, Quinn N. *Integration or Isolation? Mapping Social Connections and Well-Being Amongst Refugees in Glasgow*. Glasgow: NHS Greater Glasgow and Clyde; 2014.

66. Bagci SC, Rutland A, Kumashiro M, Smith PK, Blumberg H. Are minority status children's cross-ethnic friendships beneficial in a multiethnic context? *Br J Dev Psychol*. 2014;32:107–115. doi:10.1111/bjdp.12028

67. Pehar L, Čorkalo Biruški D, Jelić M. Longitudinal effects of direct and extended intergroup contact in multi-ethnic communities in Croatia. *Group Process Intergroup Relat*. 2022. doi:10.1177/13684302221138340

68. Huang H, Liu Y, Liu X. Does loneliness necessarily lead to a decrease in prosocial behavior? The roles of gender and situation. *Front Psychol*. 2016;7. doi:10.3389/fpsyg.2016.01388

69. Heatley Tejada A, Dunbar RIM, Montero M. Physical contact and loneliness: being touched reduces perceptions of loneliness. *Adapt Human Behav Physiol*. 2020;6:292–306. doi:10.1007/s40750-020-00138-0

70. van Dick R, Stellmacher J, Wagner U, Lemmer G, Tissington PA. Group membership salience and task performance. *J Manage Psychol*. 2009;24 (7):609–626. doi:10.1108/02683940910989011

71. Wakefield JRH, Bowe M, Kellezi B, Mcnamara N, Stevenson C. When groups help and when groups harm: origins, developments, and future directions of the "Social Cure" perspective of group dynamics. *Soc Personal Psychol Compass*. 2019;13(3):e12440. doi:10.1111/spc3.12440

72. Pettigrew TF, Tropp LR. A meta-analytic test of intergroup contact theory. *J Pers Soc Psychol*. 2006;90(5):751–783. doi:10.1037/0022-3514.90.5.751

73. Smokowski PR, Evans CBR, Cotter KL, Webber KC. Ethnic identity and mental health in American Indian Youth: examining mediation pathways through self-esteem, and future optimism. *J Youth Adolesc*. 2014;43(3):343–355. doi:10.1007/s10964-013-9992-7

74. Nakashima K, Isobe C, Ura M. How does higher in-group social value lead to positive mental health? An integrated model of in-group identification and support. *Asian J Soc Psychol*. 2013;16(4):271–278. doi:10.1111/ajsp.12031

75. Miller K, Wakefield JRH, Sani F. Identification with social groups is associated with mental health in adolescents: evidence from a Scottish community sample. *Psychiatry Res*. 2015;228(3):340–346. doi:10.1016/j.psychres.2015.05.088

76. Liu JS, Zhou Y, Li D. Developmental trajectories of loneliness during middle and late childhood: a latent growth curve analysis. *Acta Psychol Sin*. 2013;45(2):179–192. doi:10.3724/SP.J.1041.2013.00179

77. Firat M, Ataca B. Toward whom does intergroup contact reduce prejudice? Exploring national majorities' prejudice toward ethnic and migrant minorities. *J Soc Psychol*. 2022;1–17. doi:10.1080/00224545.2021.2023085

78. Vezzali L, Turner R, Capozza D, Trifiletti E. Does intergroup contact affect personality? A longitudinal study on the bidirectional relationship between intergroup contact and personality traits. *Eur J Soc Psychol*. 2018;48(2):159–173. doi:10.1002/ejsp.2313

79. Helm PJ, Medrano MR, Allen JJ, Greenberg J. Existential isolation, loneliness, depression, and suicide ideation in young adults. *J Soc Clin Psychol*. 2020;39(8):641–674. doi:10.1521/jscp.2020.39.8.641

80. Serafini G, Adavastro G, Canepa G, et al. The efficacy of Buprenorphine in major depression, treatment-resistant depression and suicidal behavior: a systematic review. *Int J Mol Sci*. 2018;19(8):2410. doi:10.3390/ijms19082410