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Effects of online and direct contact on Chinese international students' social capital in intercultural networks: testing moderation of direct contact and mediation of global competence

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Abstract
Chinese international students often face daunting challenges of building intercultural networks and receiving support from outgroup members. To facilitate their social integration, this study proposed a research model investigating the relationships of online and direct intergroup contact to social capital in intercultural networks (social support resource networks built among culturally different students). We also examined whether the three dimensions of global competence (global knowledge, attitudes, and skills) can mediate these relationships and whether direct contact can moderate the relationships of online contact to global competence and social capital. Data were collected from 210 Chinese students in Belgium. The results revealed that direct contact was positively related to both bonding and bridging social capital, through the mediators of global skills and attitudes. Online contact was related to the predicted variables in a more complex way. The moderation analyses revealed direct contact as an important moderator that modified effects of online contact. Specifically, online contact was positively related to global skills and bonding social capital at low, rather than high, levels of direct contact. Besides, online contact was negatively related to global attitudes at low, rather than high, levels of direct contact.

Keywords Chinese international student · Direct contact · Online contact · Global competence · Social capital

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Introduction

As the largest source of the international student population, Chinese international students' psychosocial and academic experiences have attracted increasing attention of researchers and educators (Cao et al. 2018). Of particular concern is that this group of students often encounter daunting challenges of building intercultural networks among culturally different students, thus leading to social segregation and acculturative stress (God and Zhang 2018; Guo et al. 2014; Kwon 2013). As such, our study focuses on how Chinese international students can form social capital in intercultural networks. Social capital means social support resources embedded in and available from social networks (Bourdieu 1986). In our study, social capital in intercultural networks specifically refers to social support resource networks Chinese international students build among culturally different students (i.e., domestic students and/or international students of multi-nationalities). Investigating social capital in intercultural networks can be important because it has been revealed as an antecedent of minority members' performance, adjustment, and mental health (Liu and Shaffer 2005; Weiqin et al. 2016). This investigation may be especially significant for Chinese international students who have been found to mainly socialize within co-ethnic networks due to the influences of their heritage collectivist cultures (Cao et al. 2018).

It is first assumed that intergroup contact can facilitate forming social capital in intercultural networks. The contact hypothesis (Allport 1954) and its extensions can shed light on this relationship. Allport's theory states that intergroup contact can effectively reduce prejudice when some optimal conditions (equal status, cooperative attitudes, and common goals) are met. Its extensions (e.g., Jon 2013; Pettigrew and Tropp 2008) demonstrate that intergroup contact can contribute to positive outcomes over and above prejudice reduction, including enhanced competence and promoted intergroup relationships (e.g., intergroup trust, intergroup empathy, and reciprocal support), even when the optimal conditions cannot be met. Although interpersonal relationships may not be directly equated to social capital, they can offer resources for social capital (Lee 2010). More importantly, this study attempts to examine functional roles of two types of contact: direct and online intergroup contact. The former is conceptualized as Chinese international students' face-to-face contact with culturally different students in the real world, while the latter is an indirect contact mode, conceptualized as their online contact with culturally different students via any type of social media. Direct and online contact are distinctive from each other in that online contact not only strengthens offline interpersonal relationships (Gil de Zúñiga and Valenzuela 2011), but also creates opportunities for individuals to contact with many new people they may not meet in physical environment (Ellison et al. 2007). Further, given that the two modes have different communicative styles and environments (Lev-On and Lissitsa 2015), they may have different functional roles in international students' psychosocial and academic experiences in host contexts. Online contact is attracting increasing attention due to the popularity and prevalent use of internet and social media. However, few empirical studies investigate its associations with social capital among minority members (Pang 2018), and even fewer simultaneously examine and differentiate effects of online and direct contact on social capital.

We also assume that the relationship between intergroup contact and social capital may not be a simple and direct relationship. Recent studies, built on the contact hypothesis, have revealed complex functioning roles of intergroup contact in predicting outcome variables, for example, with acculturation as the mediator (Lebedeva et al. 2016) and authoritarianism as the moderator (Dhont and Van Hiel 2011). In this study, we aim to further expand the existing

literature in the following two aspects. First, global competence is examined as a mediator potentially linking the two contact modes with social capital. Second, direct contact is examined as a moderator potentially modifying effects of online contact on global competence and social capital.

Intergroup contact and social capital

Social capital is conceptually divided into two dimensions: bridging social capital and bonding social capital (Putnam 2000). With the bridging perspective, individuals form weak-tie relationships among social group members from whom they can receive useful information and new perspectives. Social capital of this type improves chances of contacting people who are most appropriate for diverse purposes. With the bonding perspective, strong-tie relationships can be fostered and maintained among social group members as reflected in emotional, financial, and physical support, which tends to promote social trust, mutual cooperation, and norms of reciprocity (Putnam 2000; Weiqin et al. 2016). In the present study, we examine whether and how Chinese international students' intergroup contact can be related to forming weak-tie and strong-tie support networks with culturally different students.

Through contact, mutual understanding and recognition can be reinforced and then acknowledgement as members of a network or group becomes possible (Williams 2006). Many researchers share the idea that social capital largely results from direct and dynamic interpersonal interactions in the real world (Lin 1999; Portes 1998). Wellman et al. (2001) were among the first to investigate the relationship between contact in virtual communities and social capital, revealing that the internet provided more opportunities to augment an individual's social networks. Supporting Wellman et al. (2001), Weiqin et al. (2016) found that online contact can positively predict bridging and bonding social capital among Australian university students. More relevant to our research objectives is the study by Guo et al. (2014) in which functions of social networking sites promoted Chinese international students' perceived bridging social capital and life satisfaction. In another instance, the study by Li and Chen (2014) revealed that Chinese international students' contact intensity through social media was strongly associated with social capital formation.

Intergroup contact and global competence

Hunter et al. (2006, p. 270) defined global competence as "having an open mind while actively seeking to understand cultural norms and expectations of others, leveraging this gained knowledge to interact, communicate and work effectively outside one's environment." In recent years, global competence has become a core education goal to prepare students for the globalized world featured by inter-connectedness and inter-dependence (Reimers 2009). There is an agreement that global competence includes three dimensions: global knowledge, global skills, and global attitudes (Hunter et al. 2006; Li 2013; Meng et al. 2018). Global knowledge means knowledge learned to provide background information for intercultural interactions, including knowledge of cultures of one's own and others, world history, geography, and current affairs; global skills refer to capacities enabling one to succeed in intercultural contexts, such as identifying cultural differences and effectively engaging in cross-cultural activities; global attitudes mean one's willingness to embrace and involve in cultural diversity (Li 2013). The three dimensions can be inter-correlated yet distinct from one another in functions in intercultural environments. Hence, it is necessary to treat the three dimensions as separate constructs.

Utilizing the contact hypothesis as the theoretical base, Jon (2013) found that intercultural interactions can promote students' competence in intercultural contexts. The culture learning theory (Searle and Ward 1990) can also explain this positive relationship. The core assumption underlying this theory is that intergroup contact and factors facilitating such contact (e.g., language proficiency and personality) play a central role in domain-specific cultural acquisition (Wilson et al. 2013). Trahar and Hyland (2011) conducted a qualitative study indicating that both domestic students and international students reported multicultural competence development resulting from intercultural interactions with each other. Quantitative findings revealed that Chinese international students' host-national contact significantly enhanced their global skills and attitudes (Meng et al. 2017). In contrast, rather few studies have been conducted on the relationship between online contact and global competence. Online contact through social media is considered as common and beneficial behaviors in intercultural contexts, connecting people from diverse cultural backgrounds, conveying cultural codes embedded within the shared content, and enhancing users' foreign cultural understanding (Li and Tsai 2015). According to Moon and Park (2007), frequent use of social media can help acculturating individuals detect and learn cultural norms, behavioral features, and values of the host members. Therefore, online contact through social media may as well augment cultural knowledge, enhance cultural empathy and open-mindedness, and develop behavioral skills.

Global competence and social capital

As discussed previously, social capital is largely embedded within social networks or interpersonal relationships (Bourdieu 1986). Many studies have provided empirical evidence that globally competent international students tend to establish stronger intercultural connectedness and friendships (e.g., Meng et al. 2018; Ying 2002). Chi and Suthers (2015) found that communicative competence of international students (or academics) is positively associated with their intercultural network sizes. According to Soria and Troisi (2014), global competence can produce effective and appropriate communicative behaviors and promote adaptability and flexibility in multicultural contexts, thus facilitating intercultural friendship formation. Presumably, these students high in global competence may have more support resources available from the intercultural networks. Therefore, there are reasons to assume that global competence can be a predictor of social capital in intercultural networks.

Moderating role of direct contact and mediating role of global competence

First, we argue that online and direct contact may have interacting effects on global competence and social capital. Our argument is theoretically inspired by the extended contact hypothesis advanced in recent years (Christ et al. 2010; Dhont and Van Hiel 2011; Vezzali et al. 2017). Extended intergroup contact, as an indirect contact mode, refers to knowing and observing in-group members having friendships with outgroup members (Christ et al. 2010). These studies consistently revealed the interacting effects between extended and direct contact, indicating that when individuals have few or no direct contact experiences, they largely depend on extended contact experiences for intercultural behavioral intentions and intergroup relations enhancement (e.g., prejudice reduction, intergroup trust, and intergroup empathy). Chinese international students mainly socialize within their co-ethnic networks and often have inadequate direct contact with domestic students and other international students (e.g., Cao et al. 2018; Pham and Tran 2015). Social media has been shown to enhance minority members' social capital (Pang 2018) and multicultural competence (Moon and Park 2007). Therefore,

those Chinese students with few or no direct contact experiences may depend on online intergroup contact via social media (also an indirect contact mode) as a major channel to promote their global competence and social capital in intercultural networks. In other words, direct contact may moderate the relationships of online contact to global competence and social capital. As also revealed by Indian and Grieve (2014), contact through Facebook can be an effective compensating strategy for deriving social support when individuals have difficulties in face-to-face contact due to social anxiety.

Second, the aforementioned empirical evidence may suggest that intergroup contact may predict global competence, which, in turn, may predict social capital in intercultural networks. We can assume the mediating role of global competence for another two reasons. First, the acculturation process model advanced by Zhou et al. (2008) articulates that domain-specific culture acquisition can be a core factor linking intergroup contact and psychosocial adaptation. Second, a few prior studies revealed the mediating role of global competence. Supporting evidence can be provided by a recent study (Meng et al. 2018) in which Chinese international students' global competence mediated the relationships of foreign language proficiency to social and academic adaptation.

The present study

Based on the theoretical frameworks and empirical findings presented above, we outlined a conceptual research model (see Fig. 1) to better present the hypothesized relationships among the variables under study. Accordingly, the following hypotheses concerning the moderation and mediation are posed.

Concerning the moderating effects:

H1. Online intergroup contact will positively relate to global knowledge (H1a), global attitudes (H1b), global skills (H1c), bridging (H1d) and bonding social capital in intercultural networks (H1e), but only for Chinese students whose direct intergroup contact is low or absent.

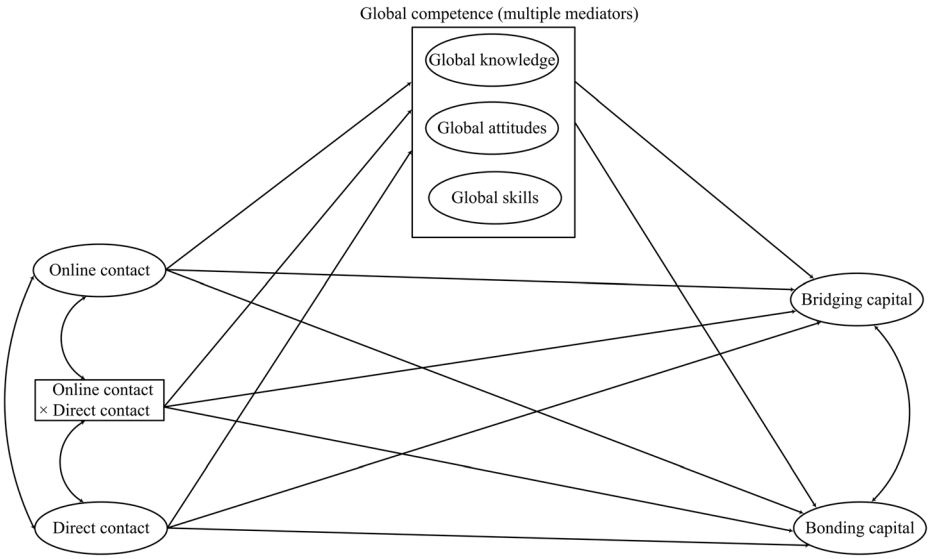

Fig. 1 The conceptual research model

Concerning the mediating effects:

H2. Global competence will mediate the relationship of online intergroup contact to bridging (H2a) and bonding social capital in intercultural networks (H2b).

H3. Global competence will mediate the relationship of direct intergroup contact to bridging (H3a) and bonding social capital in intercultural networks (H3b).

Methodology

Participants and procedure

The study's sample consisted of 210 Chinese students currently studying in a European country, Belgium. Belgium can be suitable for our research objectives for two reasons. First, international students coming to study in Belgium account for 17% of the total enrollments in tertiary education (OECD 2015). The multicultural on-campus environment can be desirable for our investigation of global competence and social capital in intercultural networks. Second, there is an obvious lack of research on Chinese international students sojourning in European Union countries, with the exception of UK (Cao et al. 2016).

All participants were recruited through the popular social media of Facebook. This way of recruitment can guarantee that the participants were all social media users, at least of Facebook. The authors first identified Chinese students in Belgium via their profile information on Facebook, such as names and locations. Once identified, a friend request was first sent to the potential participant and then research objectives, anonymity, and selection criterion were shared with him or her. The selection criterion mandated that all participants must be bachelor, master, or doctoral students from mainland China currently enrolled as full-time students at Belgian universities. They can be either degree students (those who pursued academic degrees from Belgian universities) or exchange students (those sandwich students who studied in Belgium for a period of time but pursued academic degrees from Chinese universities).

Of the 210 participants who completed the whole questionnaire, 87 (41.4%) were female students and 123 (58.6%) were male students. Their ages ranged from 19 to 42 ($M = 26.07$; $SD = 4.22$), and their average length of stay in Belgium was about 20 months ($M = 20.42$; $SD = 15.79$). The majority of the participants majored in social sciences and humanities ($N = 133$; 63.3%), followed by those majoring in physics and engineering ($N = 63$; 30%) and in life sciences ($N = 14$; 6.7%). Reported academic levels were as follows: doctoral students ($N = 55$; 26.2%), master students ($N = 129$; 61.4%), and bachelor students ($N = 26$; 12.4%).

Measures

Direct intergroup contact To facilitate the participants' understanding of the items of this scale, we explained in the questionnaire that culturally different students referred to Belgian domestic students or international students of multi-nationalities and direct contact referred to face-to-face contact with them in the real world. The intensity of such contact was assessed by three items on a scale from 1 (not at all) to 5 (a lot), adapted from a prior study (Schmid et al. 2009). Two items measured the amount of direct contact: (a) how much do you have face-to-face chat with culturally different students in Belgium and (b) how much do you do social things with culturally different students in Belgium. The third item measured friendships: (c) in Belgium, how many of your friends are culturally different students in Belgium. Cronbach's alpha was .84.

Online intergroup contact To facilitate the participants' understanding of the items of this scale, we explained in the questionnaire that online contact referred to contact with culturally different students via any type of social media, such as Facebook, Twitter, Snapchat, LinkedIn, and WeChat. Frequency and duration of online contact were measured with three items from a prior study (Bonetti et al. 2010). The first item asked the participants to indicate the number of days they had been online to contact with culturally different students in Belgium for the past week, with response categories arranging as 1 (none), 2 (1–2 days), 3 (3–4 days), 4 (5–6 days), and 5 (everyday). The other two items assessed the participants' duration of online contact with culturally different students in Belgium, respectively, on an average weekday and on an average weekend, with response categories arranging as 1 (less than 15 min), 2 (between 15 min and 1 h), 3 (1–2 h), 4 (3–4 h), and 5 (more than 4 h). The online contact scale has been validated and extensively employed in the technologically mediated communication research (Ang 2017). Cronbach's alpha was .75.

Global competence This scale was measured by sixteen items adapted from Hunter et al. (2006) and validated by Meng et al. (2018). The response categories ranged from 1 (strongly disagree) to 5 (strongly agree) or from 1 (very low) to 5 (very high). The knowledge subscale consisted of five items assessing Chinese students' levels of knowledge of their heritage culture and foreign cultures, world history, and current affairs (Cronbach's alpha = .76). The attitudes subscale consisted of six items (e.g., I am open to new cross-cultural experiences, including those that could be emotionally challenging) (Cronbach's alpha = .89). The skills subscale contained five items (e.g., I can effectively participate in social settings anywhere in the world) (Cronbach's alpha = .84). Higher scores of each subscale were reflective of higher levels of global competence on the respective dimension.

Social capital The two dimensions of social capital (i.e., bonding and bridging) were measured by the social capital scale (Williams 2006). The bridging subscale consisted of nine items (e.g., At my host university, I come into contact with new non-Chinese students all the time). Cronbach's alpha was .87 for this subscale. The bonding subscale consisted of seven items (e.g., I have some friends of non-Chinese students at my host university I can turn to for advice about making very important decisions). Cronbach's alpha was .94 for this subscale.

Results

Preliminary analysis

In this study, we intend to examine the inter-relationships among the variables of online and direct intergroup contact, different dimensions of global competence (i.e., global knowledge, skills, and attitudes), and bonding and bridging social capital. Besides, we are interested in whether the demographic variables controlled for (i.e., age, gender, length of stay in Belgium, majors, and academic levels) are associated with the outcome variables. Means, standard deviations, minimum and maximum values, and zero-order correlations for all these focal variables under study and the demographic variables are presented in Table 1. As shown in the table, all the focal variables were moderately correlated with each other, while the demographic variables were not correlated with the outcome variables. Therefore, the demographic variables were not incorporated into the research model for further analysis.

Table 1 Means, standard deviations, and correlations of the variables ($N = 210$)

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11	12
1. Direct contact	2.98	.81	–											
2. Online contact	2.13	.89	.624**	–										
3. Global attitudes	3.99	.70	.290**	.177*	–									
4. Global knowledge	3.32	.64	.150*	.144*	.322**	–								
5. Global skills	3.64	.63	.499**	.425**	.598**	.551**	–							
6. Bridging capital	3.32	.66	.553**	.427**	.445**	.203**	.556**	–						
7. Bonding capital	3.08	.97	.667**	.540**	.364**	.300**	.643**	.619**	–					
8. Gender	1.59	.49	− .087	.046	.106	− .059	.001	− .037	− .072	–				
9. Age	26.07	4.22	.102	− .024	.025	− .084	− .043	.112	.018	− .043	–	.		
10. Length of stay	20.42	15.80	.109	− .020	.090	− .066	.087	− .004	.124	− .051	.351**	–		
11. Majors	1.77	.56	.133	.123	.080	.040	.131	.116	.122	.168*	.061	− .115	–	
12. Academic levels	2.14	.61	.016	− .124	.029	− .065	− .090	.014	− .063	− .096	.622**	.081	− .074	–

*$p < .05$; ** $p < .01$. Direct contact (min value 1.33, max value 5.00); online contact (min value 1.00, max value 5.00); global attitudes (min value 1.20, max value 5.00); global knowledge (min value 2.00, max value 5.00); global skills (min value 2.00, max value 5.00); bridging capital (min value 1.00, max value 5.00); bonding capital (min value 1.00, max value 5.00)

The measurement model and common method variance

The measurement model including seven latent variables was evaluated in AMOS 22.0. Three-item parcels were respectively created for the variables of global attitudes, global skills, global knowledge, bridging and bonding capital so as to reduce model complexity and estimation errors (Bandalos and Finney 2001; Little et al. 2002), after these variables were confirmed to be unidimensional by conducting a series of exploratory factor analyses. In creating the parcels, we employed the item-to-construct balance method so as to equalize the average factor loadings of items of each group (Little et al. 2002, p. 166). Individual items were used as indicators for the latent variables of direct and online contact. Therefore, each latent variable in the model was measured by three observed indicators.

According to the suggested threshold values (Byrne 2010), the measurement model achieved an acceptable model fit: χ^2 (167, $N = 210$) = 322.326, $P < .001$, $\chi^2/df = 1.930$ (accepted value < 3), SRMR = .055 (accepted value < .08), RMSEA = .067 (accepted value < .08), CFI = .949 (accepted value > .95), and TLI = .935 (accepted value > .90). All factor loadings of the observed indicators on the latent variables were significant at the level of $P < .001$, ranging from .65 to .94.

Average variance extracted (AVE), square roots of AVE, and composite reliability (CR) for model constructs are provided in Table 2. The results indicated that all values of CR, AVE, and square roots of AVE exceeded their respective threshold values (CR: larger than .60; AVE: larger than .50; square roots of AVE: larger than a specific variable's correlation coefficients with all other variables, see Table 1 for comparison), demonstrating satisfactory construct reliability, convergent validity, and discriminant validity of the measurement model (Bagozzi and Yi 1988; Chin 1998).

As using self-reported items in cross-sectional studies may cause common method bias, we performed the Harman's single factor test recommended by Podsakoff et al. (2003). All 38 items of the seven variables were forced to load on a single un-rotated factor and the results showed that only 37% of the variance was extracted, indicating that much of the variance was not captured by this single factor. In addition, a one-factor model was evaluated, revealing a very poor model fit: χ^2 (629, $N = 210$) = 2626.775, $P < .001$, $\chi^2/df = 4.176$, SRMR = .113, RMSEA = .123, CFI = .586, and TLI = .562. Taken together, these results showed that common method bias was not a problem for this study.

Test of the structural model

We tested the structural model which was slightly larger than the measurement model due to the inclusion of the interaction term between online and direct contact. To create the interaction

Table 2 Composite reliability (CR), average variance extracted (AVE), and square roots of AVE for latent constructs in the measurement model

Value	Online contact	Direct contact	Global knowledge	Global skills	Global attitudes	Bridging capital	Bonding capital
CR	.85	.79	.76	.85	.89	.88	.95
AVE	.65	.56	.52	.67	.74	.71	.85
Square roots of AVE	.81	.75	.72	.82	.86	.84	.92

term, online and direct contact were first centered around their respective mean scores and then the centered scores were multiplied (Aiken and West 1991).

The initial evaluation of the structural model revealed that global knowledge was not related to any of the predictor variables and the outcome variables, so it was dropped for model parsimony. The subsequent test showed that the model achieved a good model fit: χ^2 (132, $N = 210$) = 262.271, $P < .001$, $\chi^2/df = 1.987$; SRMR = .046; RMSEA = .069; CFI = .953; TLI = .940. As shown in Fig. 2, online contact was not directly related to global attitudes ($\beta = -.15$, $P = .32$), global skills ($\beta = .21$, $P = .12$), bridging social capital ($\beta = .17$, $P = .17$), and bonding social capital ($\beta = .17$, $P = .12$). In contrast, direct contact was directly and positively related to the four predicted variables: global attitudes ($\beta = .39$, $P = .005$), global skills ($\beta = .48$, $P < .001$), bridging social capital ($\beta = .39$, $P < .001$), and bonding social capital ($\beta = .49$, $P < .001$). Furthermore, global attitudes ($\beta = .23$, $P = .014$), rather than global skills ($\beta = .18$, $P = .11$), predicted bridging social capital. Global skills ($\beta = .30$, $P = .003$), rather than global attitudes ($\beta = .03$, $P = .74$), predicted bonding social capital.

Moderation analyses

The structural model revealed that the interaction between online and direct contact predicted global attitudes ($\beta = .18$, $P = .021$), global skills ($\beta = -.17$, $P = .017$), and bonding social capital ($\beta = -.17$, $P = .006$). To further probe the interaction effects, we conducted a series of simple slope analyses (Aiken and West 1991) to respectively examine effects of online contact on bonding social capital, global skills, and global attitudes at low (one *SD* below the mean) and high (one *SD* above the mean) levels of direct contact. The results indicated that at low levels of direct contact, online contact was significantly and positively related to bonding social capital ($t = 4.596$, $P < .001$) and global skills ($t = 3.167$, $P < .01$), whereas the two relationships were not significant at high levels of direct contact (for the online contact-bonding social capital relationship, $t = 1.147$, $P > .05$; for the online contact-global skills relationship, $t = 1.182$, $P > .05$) (see Figs. 3 and 4). In addition, at low levels of direct contact,

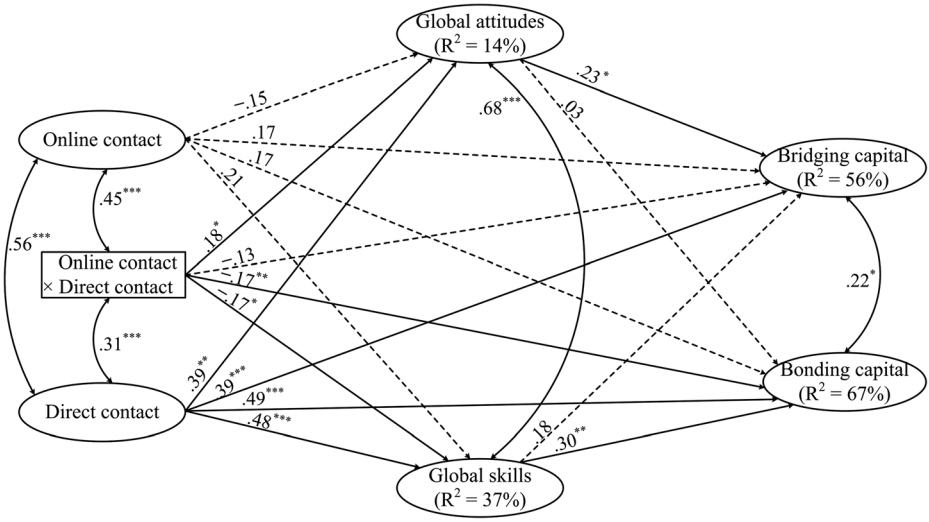

Fig. 2 Results of testing the structural model. *$p < .05$, **$p < .01$, ***$p < .001$. The solid lines indicate significant paths; the dotted lines indicate non-significant paths

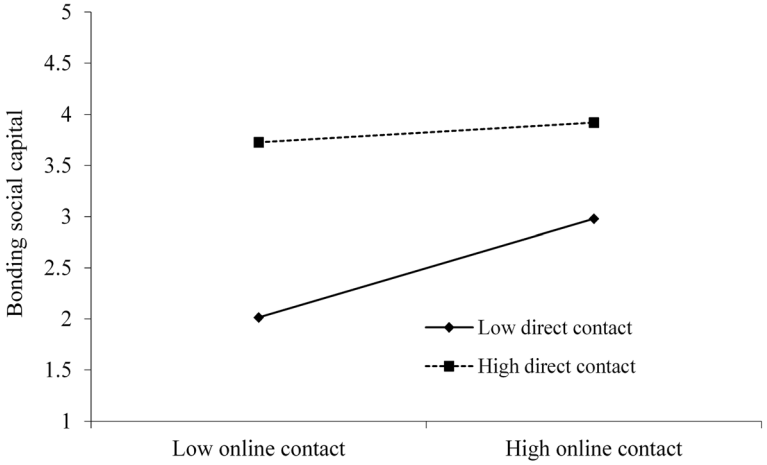

Fig. 3 Interaction effects between online and direct contact on bonding social capital

online contact was significantly and negatively related to global attitudes ($t = 1.938$, $P < .05$), whereas this relationship was not significant at high levels of direct contact ($t = 1.123$, $P > .05$) (see Fig. 5). Thus, H1c (moderating effects on global skills) and H1e (moderating effects on bonding social capital) received support from the results, but H1a (moderating effects on global knowledge) and H1d (moderating effects on bridging social capital) were not supported. Although the results also revealed the moderating effects on global attitudes, this moderation was not in the expected direction. Thus, H1b received partial support.

Mediating analyses

Mediation analyses were conducted using bootstrapping method in SEM. We first generated 5000 data samples by random sampling with replacements based on the original data sets ($N = 210$) and then determined the significance of mean indirect effects according to 95% confidence intervals (CI). Specifically, if the 95% CI does

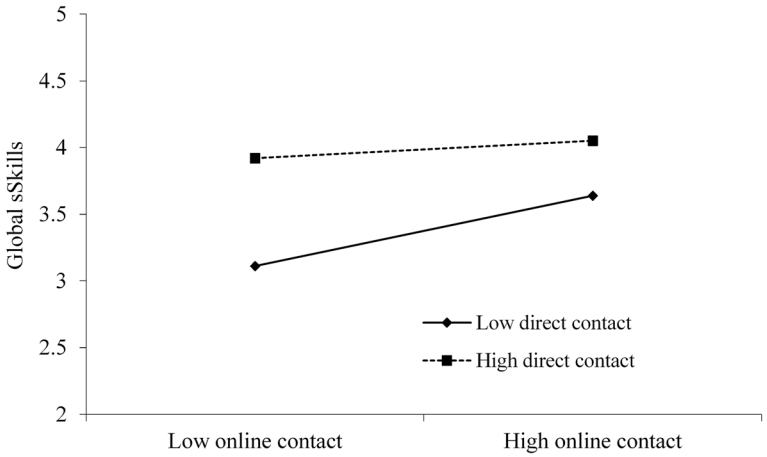

Fig. 4 Interaction effects between online and direct contact on global skills

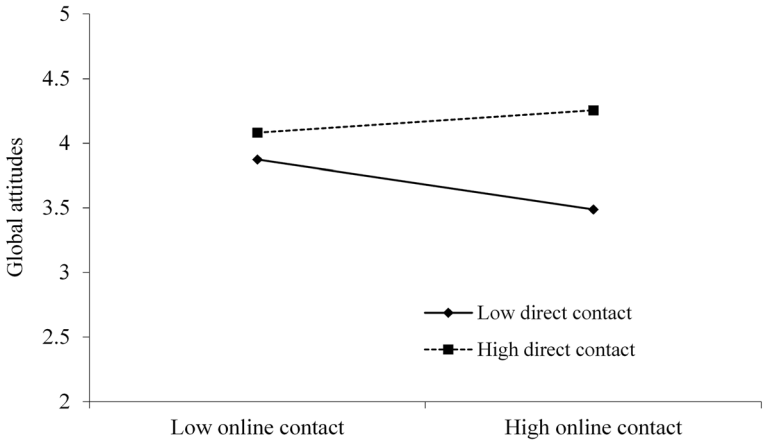

Fig. 5 Interaction effects between online and direct contact on global attitudes

not include zero, we can conclude that the indirect effect is statistically significant (Cheung and Lau 2007; Shrout and Bolger 2002).

The results revealed that indirect effects of online contact on both bridging social capital (95% CI [− .161, .154], $P > .05$) and bonding social capital (95% CI [− .93, .342], $P > .05$) were not significant, showing that global competence did not mediate these relationships. Hence, H2 was not supported. Indirect effects of direct contact on both bridging social capital (95% CI [.046, .288], $P < .05$) and bonding social capital (95% CI [.070, .371], $P < .05$) were significant, indicating that global competence functioned as a mediator and H3 was supported. More specifically, global skills and attitudes partially mediated the relationships of direct contact to both bridging and bonding social capital because their direct path coefficients were still significant (see Fig. 2).

Discussion and implications

The present study combined both moderation and mediation perspectives in a single design. Results from the SEM analysis and simple slope analyses confirmed direct intergroup contact as a moderator, uncovering the conditions under which online intergroup contact exerted its effects. Specifically, online intergroup contact was significantly associated with global attitudes, global skills, and bonding social capital at low, rather than high, levels of direct intergroup contact. The results also revealed mediating effects of global attitudes and skills on the relationships of direct intergroup contact to bridging and bonding social capital.

Effects of direct intergroup contact

Consistent with prior studies (Meng et al. 2017; Trahar and Hyland 2011), our results showed that direct contact can be beneficial for global competence. Specifically, direct contact was positively predictive of global attitudes and skills, showing that Chinese international students with more direct contact with culturally different students tended to be more skillful in intercultural involvement and collaborations, and to be more open-minded toward cultural differences and readier to embrace cultural diversity. This finding echoes the argument that direct intergroup contact lays the affective, behavioral, and cognitive ground for improving

capacities and cultivating open-mindedness (Kormos et al. 2014). In addition, our results indicated that direct contact was not only related to strengthening the existing strong intercultural ties but also associated with bridging new weak intercultural ties as support resources. These revealed positive relationships offered theoretical implications for Allport's contact hypothesis (1954) guiding in this study. First, benefits of intergroup contact can be extended from the widely discussed topics, such as promoting intergroup attitudes and relations, to development in personal (i.e., global competence) and contextual resources (i.e., social capital). Second, functioning mechanisms of intergroup contact can be more complicated than what has been revealed in the existing literature. One the one hand, direct contact functioned as a moderator modifying effects of online contact. On the other hand, global competence functioned as a mediator connecting direct contact with the both types of social capital. These mechanisms will be further discussed in the following subsections.

Interacting effects between online and direct contact

Compared with direct contact, the relationships of online contact to global competence and social capital were more complex. Superficially, online contact seemed to be unrelated to these variables. However, the moderation analyses revealed online contact can be actually a positive predictor of bonding social capital and global skills, but only among those students having few or even no direct contact experiences. As discussed previously, recent studies have revealed the interaction between direct and extended contact, indicating that extended contact can enhance intergroup attitudes and relations only among individuals whose direct contact was scarce or absent (Christ et al. 2010; Dhont and Van Hiel 2011; Vezzali et al. 2017). In this regard, our study has provided the first-hand empirical evidence that online contact, functioning similarly to the extended contact, can compensate for the lack of direct face-to-face contact. The moderation implied that Chinese students low in direct contact may depend on online contact through social media as main channels for mastering intercultural skills and building strong intercultural ties as support resources. Big advantages of this indirect mode of online contact are that it is largely free from intergroup anxiety during the contact situation and allows individuals to think longer before exchanging messages (Hasler and Amichai-Hamburger 2013), thus possibly improving quality of contact and mutual relationships. In contrast, Chinese students high in direct contact may simply depend on these direct experiences for global competence development and social capital formation in intercultural networks. These findings can be important for Chinese international students because they tend to lack significant contact with domestic students and other international students (e.g., Cao et al. 2017; Kwon 2013).

Interestingly, the moderation analyses also revealed that online contact was negatively associated with global attitudes at low, rather than high, levels of direct contact, which was contrary to our expected direction. Global attitudes are conceptualized as one's positive attitudes toward cultural differences and willingness to engage in culturally diverse activities (Hunter et al. 2006; Li 2013). In the short term, online communities can enable acculturating individuals to be largely free from intergroup anxiety and communication apprehension which they may have substantially experienced in offline real-world communities (Hasler and Amichai-Hamburger 2013). In the long term, however, their confidence and willingness to communicate with cultural others in physical environment can be impaired if they ascribe successful online contact experiences to the unique features of the internet, such as anonymity, disinhibition, and reduced anxiety (McKenna et al. 2002). As also revealed by Cudo et al.

(2016), overuse of internet for contact purposes may cause social isolation from the outside environment. Of relevance, those students who solely rely on online contact but lack direct contact with culturally different students may have reduced intentions to initiate intercultural interactions in the real world, thus possibly decreasing global attitudes. These may be underlying reasons for the unfavorable relationship between online contact and global attitudes at low levels of direct contact.

Direct and mediating effects of global competence

Prior studies extensively document beneficial effects of global or multicultural competence on psychosocial adaptation, mental well-being, and intercultural connectedness (Meng et al. 2018; Torres and Rollock 2004). The present results can complement the prior research by providing new insights into functional roles of global competence. Specifically, Chinese students high in global attitudes tended to have more bridging social capital in intercultural networks, and those high in global skills tended to establish more bonding social capital in intercultural networks. It makes sense that being open-minded and embracing cultural differences can be helpful to alleviate stereotyping attitudes (Wilson and Dalton 1997) and initiate intercultural communicative behaviors (Korol et al. 2018), thus facilitating building new and weak intercultural ties. In contrast, communicative and collaborative skills can be helpful to maintain and strengthen the existing strong intercultural ties.

The confirmed mediating effects of global competence revealed the complex relationships of direct contact to bridging and bonding social capital in intercultural networks. In more details, it was global attitudes and skills that mediated these relationships. Furthermore, the result that the direct paths from direct contact to bridging and bonding capital were still significant showed that global attitudes and skills partially mediated these relationships and suggested that their relationships may be even more complicated than we originally expected. Other variables (e.g., acculturation, intergroup trust, and intergroup empathy) may play a more important mediating role in these relationships.

In contrast, global knowledge did not function as a mediator because it was associated with neither the predictor variables (online and direct contact) nor the outcome variables (bonding and bridging capital). Global knowledge was mainly assessed with regard to interest in global issues, knowledge of one's own and foreign cultures, and world geography and history. As discussed by Johnson et al. (2011), international students tend to stay abreast of global issues and knowledge mainly through newspapers, magazines, books, television, internet, cultural training programs, and traveling abroad experiences. Therefore, global knowledge international students gain through intercultural interactions (both online and offline) can be much less salient than the knowledge they gain through those diverse sources mentioned above. This may possibly explain the lack of relationship between intergroup contact and global knowledge. In addition, global knowledge did not produce significant paths to bonding and bridging capital. One underlying reason can be that acculturating individuals who acquire adequate cultural knowledge but possess some negative individual-level attributes (e.g., intergroup avoidance, anxiety, or withdrawal) are often ineffective in communicating the knowledge to cultural others and utilizing the knowledge in intercultural interactions, which undermines intercultural communication effectiveness (Presbitero and Attar 2018) and consequently hinders intergroup friendship development or cross-cultural adjustment (Florack et al. 2014). Thus, global skills (communicative skills in intercultural involvement) and attitudes (readiness for intercultural involvement) may be superior to global knowledge in directly predicting social capital in intercultural networks.

Practical implications

The findings of this study have some clear implications for host university management. Although international students sojourn in a culturally different environment, many of them lack face-to-face intergroup contact or avoid such contact due to intergroup anxiety (Wang et al. 2017). Our finding suggested that the host tutors, administrators, and counselors can devise a two-step intervention for these international students having little intergroup contact or feeling intimidated by such contact. In the first step, online communities can be created and utilized to integrate them with other culturally diverse students. More importantly, topics with common interest and tasks with common goals have to be designed to increase their willingness for online participation and intensify their online behaviors. As suggested by the moderation result, this strategy can possibly enhance intercultural communicative skills and intercultural bonding for those international students having problems with direct intergroup contact. Our moderation result also implied that too much online contact but little direct contact may reduce international students' global attitudes. Thus, in the second step, the management staff need to create opportunities to bring the online relationships to the real-life environments after their initial intercultural ties in online communities are built over time. The intercultural skills and connectedness having enhanced in online communities may facilitate effectiveness of direct contact behaviors among the culturally diverse students.

Our finding also highlighted the importance of direct intergroup contact for its direct and positive relationships with global competence and social capital in intercultural networks. Peer-pairing programs (Ward 2006) and integrated residential programs (Smart et al. 2000) have been shown to effectively mix international students and domestic students. Besides, various group-based activities can be organized to increase intercultural interactions and foster intercultural ties, such as sport events, group traveling, and debates on intercultural issues. These activities involving collaboration and communication can produce higher levels of contact quality (Leask and Carroll 2011). However, two critical issues have to be taken into account in offering the activities and service programs. First, these interventions mixing international students (both degree students and exchange students) and domestic students need to be designed properly and wisely to avoid superficial contact which increases chances of misunderstanding and negative emotions among culturally different students (Jon 2013). Further, they need to be organized for entertainment purposes. According to Lee et al. (2018), leisure activities can be important for Asian international students to produce meaningful contact, build strong social networks, and adapt to the host institutions due to relaxed feelings and passionate involvement. Second, without regular and persistent interventions, international students tend to quickly retreat back to their co-ethnic networks. Though somewhat costly and time-consuming, such interventions can be essential for the host institutions to reap the benefits from social, intellectual, and cultural diversity. One possible solution is that tutors and administrators design and organize the interventions at the initial phase, but can leave the work to student communities or international students who are active and competent in intercultural engagement when the interventions stay on track.

Limitations and conclusion

Several limitations need to be noted in the present study. First of those is the cross-sectional design. Future longitudinal research can be conducted to track the trajectories of direct and

online contact and their impact. The second limitation is that the study tested the hypotheses among Chinese students sojourning in Belgium. As such, it requires caution to generalize the present results to other groups unless these results are replicated by future research among those sample groups. The third limitation is that this study did not differentiate online contact of different types, such as video-based and text-based contact. Future research is warranted to simultaneously examine these different types, which may generate more insights into functional roles of online contact. The fourth limitation is the sampling approach. We recruited the participants through the popular social media of Facebook. Although it can guarantee that the participants were social media users, those who primarily used other social media (e.g., Twitter, Snapchat, and LinkedIn) may be excluded for participation. Thus, future research is recommended to collect data from diverse sources and gain more nuanced understanding of Chinese international students.

Despite the limitations, the findings of this study can add new knowledge to the literature on international students' cross-cultural transitions by uncovering functioning mechanisms of online and direct contact. In terms of online contact, it was significantly associated with global skills, global attitudes, and bonding social capital, but these associations were only shown at low, rather than high, levels of direct contact. To the authors' knowledge, this study can be the first to reveal the interacting effects between online and direct contact. In terms of direct contact, it was indirectly related to bridging and bonding social capital via the mediators of global attitudes and skills. The revealed mediating effects have also extended our understanding of functioning mechanisms of global competence. These findings can shed light on designing effective interventions and service programs for the host university to facilitate international students' cross-cultural transitions.

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