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FACE-TO-FACE VERSUS DIGITAL INTERGROUP CONTACT: LINKS WITH DIVERSITY IDEOLOGY, SOCIAL SELF-EFFICACY, SELF-EXPANSION, AND LONELINESS

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Contact between group members enhances intergroup perceptions and attitudes. In a world where people spend more time online, people also engage in digital intergroup contact (mainly through social networking services). The potential outcomes of digital contact, particularly in relation to social well-being, are yet to be fully explored. Using a correlational design, the current research (N = 398) tested quantity and quality of both digital and face-to-face intergroup (specifically, interethnic) contact as simultaneous predictors of diversity ideology, social self-efficacy, self-expansion, and loneliness. Results indicated that when tested as simultaneous predictors, only quantity and quality of face-to-face contact predicted more positive diversity ideology, greater self-expansion, and less loneliness. Quality of face-to-face contact also moderated the role of digital contact quality on diversity ideology and self-expansion. The association between different modes of intergroup contact and individual outcomes beyond prejudice is discussed in light of recent developments in contact literature.

Keywords: Intergroup contact; Diversity; Self-expansion; Loneliness; Tertiary transfer.

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In the past twenty years there has been a radical change in the way people interact, facilitated by computer-mediated communication, triggering psychological processes that impact human behavior (McKenna & Bargh, 2000). The Internet is now an inherent part of regular life, with approximately 93% of the United Kingdom population using the Internet daily in 2021, compared to 45% in 2006 (Statista Research Department, 2021). Online communication is deemed to be the primary use of the Internet (Kraut et al., 1999), and in particular Social Networking Services (SNS), for example, Facebook, Instagram, and more recently Tik Tok, have surged in popularity, largely facilitated by smartphones (Faelens et al., 2021).

Digital contact via SNS shares some similarities to face-to-face contact, in that both forms of contact are instantaneous, and in a sense naturalistic, specifically in present times where digital communication is required in many business and educational environments (White et al., 2015). Moreover, unlike indirect contact such as extended or vicarious contact, digital contact includes the self actively in the communication, similar to

face-to-face contact situations (White et al., 2015). However, the conditions which promote contact as a tool to enhance social well-being may manifest differently in a digital space compared to a face-to-face interaction (Harwood, 2021). Interestingly, Cao and Meng (2020) found evidence of a moderation effect, demonstrating that (extended) digital contact positively predicted bonding of social capital and global skills in an intergroup setting only among people who had few or even no direct contact experiences. The authors suggested that reduced intergroup anxiety plays a key role in digital interactions, enhancing the quality of the interaction, a condition that was also highlighted in more structured electronic contact studies (e.g., White et al., 2019). Scholars have suggested that the digital space may be able to create an optimal contact situation to facilitate and even enhance the benefits of intergroup contact, as intergroup anxiety tends to be lower than in typical face-to-face intergroup interactions (Amichai-Hamburger et al., 2015; Amichai-Hamburger & McKenna, 2006; Bagci et al., 2021). Furthermore, intimate interactions and self-disclosure are facilitated in digital contact due to the relative absence of physical or status features (Amichai-Hamburger & McKenna, 2006).

Both face-to-face and digital environments may create opportunities for meeting and interacting with people from outgroups, and thus pave the way to the formation of intergroup contact. In turn, intergroup contact, via in-person experiences and/or digitally, is likely to shape intergroup attitudes and behaviors (White et al., 2015, 2020). Intergroup contact research has demonstrated that frequent and positive contact with people belonging to an outgroup leads to the reduction of prejudice in a variety of intergroup contexts (Allport, 1954; Hodson & Hewstone, 2013; Pettigrew & Tropp, 2006). Although the benefits of face-to-face intergroup contact for prejudice reduction have been studied widely over the past 60 years (Dovidio et al., 2003; Paolini et al., 2021; Vezzali & Stathi, 2021), research on digital intergroup contact, defined in this research as unstructured contact as it emerges via social media platforms (Amichai-Hamburger et al., 2015; see also Harwood, 2021), is relatively scarce.

Even less is known about the potential role of digital contact, relative to face-to-face contact, in relation to various individual outcomes beyond prejudice. While previous research has shown some evidence for the associations between direct forms of intergroup contact and individual well-being (e.g., Bagci et al., 2014), no research to our knowledge, has investigated the implications of digital intergroup contact with outgroup members for social well-being indicators. We define social well-being here as a sense of worth, connectedness and belonging, in line with Keyes's (1998) definition, who highlighted social integration, acceptance, contribution, actualization, and coherence as major well-being markers. In this research, we aim to directly assess the benefits of different modes of intergroup (specifically, interethnic) contact, when tested against each other. In particular, we explore the quantity and quality of both face-to-face and digital intergroup contact (via SNS) as simultaneous predictors of social well-being indicators, that is, diversity ideology, social self-efficacy, self-expansion, and loneliness. This way, we aim to understand the implications of both face-to-face and digital (via SNS) intergroup contact for the self, extending beyond the typically studied group-level outcomes of contact in the existing literature.

Considering the prominence of digital environments in daily life and the potential of such environments for creating effective interactions with outgroup members, it is critical to examine if digital contact might be considered as a mechanism that predicts social well-being indicators, in addition to face-to-face contact. Acknowledging evidence that SNS cannot generally substitute real-life contact, but can complement it (Arampatzi et al., 2018; Cao & Meng, 2020), as well as studies that demonstrate indirect types of contact to be effective particularly in the absence of direct contact (e.g., Vezzali et al., 2017), we also test the potential moderating role of face-to-face contact in the relationship between digital contact and social well-being indicators. Our argument for suggesting face-to-face contact will moderate digital contact stems from research that points to direct, face-to-face experiences moderating indirect forms of contact such that contact effects emerge only — or mostly — among participants with low levels of direct contact experiences (Hoffarth & Hodson, 2016; Vezzali et al., 2017).

More broadly, there is evidence that online supportive interactions are more beneficial when such face-to-face interactions are scarce (e.g., Chan & Cheng, 2016; Liu & Yu, 2013). Furthermore, previous research has demonstrated that SNS may be used to enhance social capital and multicultural competence for those that do not have the opportunity for many direct contact experiences (Cao & Meng, 2020; Ye et al., 2023). In line with this, if people are engaging with SNS to enhance or obtain social capital, it is reasonable to predict that direct contact should moderate the relationship between digital contact and social well-being indicators as well.

Intergroup Contact and Positive Diversity Ideology

Previous intergroup contact research focused extensively on attitudes toward outgroup members yet a relevant, individual-level indicator of general outgroup attitudes — diversity ideology — has not been fully examined as an outcome of intergroup contact. We suggest that investigating diversity ideology is important as this variable stands as a critical indicator of general outgroup attitudes as well as social well-being. The link between intergroup contact and positive diversity ideology is in line with current theoretical and empirical accounts regarding the tertiary transfer effects of intergroup contact (Boin et al., 2021; Meleady et al., 2019), which have indicated that contact with outgroup members does not only improve attitudes toward the target and secondary outgroups, but also affects more general cognitive processes in the individual (e.g., cognitive flexibility) triggering more complex and systematic thinking.

Drawing from the intergroup relations literature to tangentially support the association between intergroup contact and diversity ideology, Schwab and Greitemeyer (2015) found a significant positive relationship between the percentage of outgroup Facebook friends and positive attitudes toward outgroups, a relationship which was mediated by enhanced humanitarian-egalitarian values. A meta-analysis involving 23 studies investigated the effect of online intergroup contact on improving intergroup relations, and found that the effect was significant, especially when contact was cooperative (Imperato et al., 2021). Lissitsa and Kushnirovich (2019) found with a sample of Israeli Jewish participants that digital contact predicted less subtle prejudice toward Israeli Arabs, whereas face-to-face contact was associated with less subtle but also blatant prejudice toward the outgroup. Even exposure to outgroups through digital media (i.e., online news and social media), in line with the parasocial contact hypothesis (Schiappa et al., 2005), has been found to predict more offline contact via improved attitudes (Lissitsa & Kushnirovich, 2021).

Several psychological (such as intergroup anxiety) and physical barriers (such as segregation) are known to reduce individuals' willingness to seek out face-to-face intergroup contact (Kauff et al., 2021). Hence, SNS provide a potentially useful tool to introduce intergroup contact with a demographic of people that are unlikely to seek out face-to-face interactions or have limited opportunity for face-to-face intergroup contact. SNS may provide the opportunity for new intergroup relationships to form, which may not have otherwise occurred. Friendships may be sought more easily and intentionally through the wider realms of the Internet than through coincidental meetings, as people can connect with others who share similar interests (Amichai-Hamburger & McKenna, 2006). This process may have positive implications for improved diversity ideology, since common goals, cooperation, voluntary engagement, as well as shared interests in intergroup experiences are likely to strengthen the outcomes of contact (e.g., Bagci et al., 2021; Brannon & Walton, 2013; Pettigrew & Tropp, 2006). Online social networking has also been found to be a successful means to bridge social capital (Ellison et al., 2007; Sabatini & Sarracino, 2017), maintain long-distance relationships (Ellison et al., 2007), and to meet those from other cultures that they may have not had the opportunity, or may be unwilling, to meet in person.

While previous research has generally shown quality of face-to-face contact to have a stronger effect on attitudes compared to quantity (e.g., Tropp et al., 2017) and contact quantity to be associated with improved

attitudes only when such interactions included high quality (Cernat, 2019), less is known about differential effects of digital contact quantity and quality (only seven out of 23 studies in Imperato et al.'s 2021 meta-analysis included quality measures). Overall, it could be suggested that to make contact experiences meaningful for individuals, an optimal combination of both quantity and quality is important (Johnston & Glasford, 2018; Stathi et al., 2020; Voci & Hewstone, 2003; Wojcieszak & Azrout, 2016). The quantity of intergroup contact may grow more easily through online networking with outgroups (via SNS) than meeting outgroup members in the real world. However, whether the depth and quality of these online networks is sufficient to enhance diversity ideology is more contentious, if ultimately meaningful relationships are needed to change ideologies (Brown & Patterson, 2016; De Coninck et al., 2021). Thus, a simultaneous, direct comparison between quantity and quality of face-to-face and digital contact, as predictors of diversity ideology, is theoretically pertinent.

Intergroup Contact and Social Self-Efficacy

The concept of social self-efficacy denotes an "individual's confidence in their ability to engage in the social interactional tasks necessary to initiate and maintain interpersonal relationships" (Smith & Betz, 2000, p. 286). Diversity experiences and contact with outgroup members allows individuals an exposure to new information and varied perspectives that may enhance their social skills and confidence in dealing with future situations (Bandura, 1977; Bowman, 2010; see also Yang et al., 2016). Additionally, considering that intergroup contact is anxiety-provoking (Stephan & Stephan, 1985), having successful intergroup interactions that reduce such anticipated fears and concerns may enhance one's confidence to socially interact with others more easily. Indirect evidence for this suggestion comes from developmental research demonstrating friendships which cross group boundaries to be associated with greater social skills, such as leadership skills and relational inclusion (e.g., Kawabata & Crick, 2008; Lease & Blake, 2005). Thus, intergroup contact may be beneficial for improving one's general social self-efficacy, showing evidence for individuals' competence of and success in navigating relationships across diverse groups of people. This is also in line with the tertiary transfer effects of intergroup contact (Boin et al., 2021; Meleady et al., 2019). For example, exposure and engagement with diverse outgroups increases cognitive flexibility, creativity, problem-solving skills, and social competence (e.g., Kawabata & Crick, 2008; Maddux & Galinsky, 2009; Sommers, 2006), which suggests that intergroup contact may contribute to one's confidence in forming effective social relations.

Social self-efficacy has been conceptualized in various ways in the contact literature. For example, Bagci et al. (2020) introduced the concept of cross-ethnic friendship self-efficacy (CEFSE) and found that prior (direct and indirect) contact, along with intergroup anxiety and social norms, predicted greater CEFSE beliefs among children, which in turn predicted higher quality cross-ethnic friendships. Stathi et al. (2011) found that imagined contact enhanced contact self-efficacy, while Mazziotta et al. (2011) showed that higher levels of contact self-efficacy (following vicarious contact) sequentially predicted less uncertainty, improved intergroup attitudes and willingness to engage in contact. Closer to the current research, Kim et al. (2019) found that college students' perceived SNS network heterogeneity, tangentially related to intergroup contact, predicted greater social self-efficacy (in a measure that is closer to the general social self-efficacy we used in our research), which was in turn associated with greater campus life satisfaction.

SNS platforms may provide an environment for social self-efficacy to develop and help people feel more confident in their social abilities in subsequent face-to-face settings (McKenna & Bargh, 2000). At the same time, however, social self-efficacy is also likely to grow out of intimate intergroup contact, which may be

more likely to develop in face-to-face, rather than digital, interactions. Thus, exploring the relationship between quantity and quality of both digital and face-to-face contact and social self-efficacy is of key importance.

Intergroup Contact and Self-Expansion

When considering the value of intergroup contact, ample research has concentrated on the psychological challenges posited by outgroups (Shelton et al., 2009). Although this focus is largely driven by theoretical emphasis of intergroup contact as a prejudice reduction technique, current research trends also suggest that intergroup contact produces tertiary effects, promoting cognitive liberalization, creativity, and social competence (Meleady et al., 2019). As such, the knowledge that stems from exposure to and engagement with outgroups may enhance self-expansion, which is described as one's motivation and willingness to expand their efficacy through close relationships (e.g., Aron et al., 2013). Motivation for self-expansion can, in turn, ameliorate intergroup relations (Paolini et al., 2016), while it has also been theorized as a predictor of intergroup contact seeking (Kauff et al., 2021).

The motivation for self-expansion is rooted on the self-expansion model (Aron & Aron, 1986), which suggests that people engage with others to acquire new perspectives, resources, and identities. In essence, the model suggests that this is achieved via the inclusion of the other in the self (Aron et al., 1992). For people to gain a level of resources, skills and identities capable of expanding the self, they need to reach out to outgroups, which hold unique information, often unavailable by ingroups (Paolini et al., 2016; Wright et al., 2002). The global social connections that can be made on SNS should allow for self-expansion through the diverse ethnic relationships that can be created with outgroups. The accessible nature of SNS allows to seek out people with different ethnic backgrounds (i.e., ethnic outgroups) more easily, which can help further enrich the self via exposure to different identities and worldviews. It is thus plausible that intergroup contact both in the physical and the digital (SNS) space will be associated with greater self-expansion.

Intergroup Contact and Loneliness

Although there is a recent surge in digital connection, there is evidence that new online technologies may also contribute to rising loneliness (i.e., the subjective experience of having social networks that are smaller or less fulfilling than desired; Peplau & Perlman, 1979), and this trend has been observed in both popular literature (Marche, 2012) and in empirical research (Nowland et al., 2018). Existing studies draw attention to a reciprocal relationship between social media use and loneliness, that is, people who feel lonely or have social anxiety are more prone to use SNS to seek out friendships, however prolonged and excessive SNS usage can also lead to increased feelings of loneliness (Okabe-Miyamoto et al., 2021). For example, when SNS are used to escape uncomfortable interactions in the social world, feelings of loneliness are increased (Nowland et al., 2018). Nowland and colleagues suggest that loneliness determines how people interact with the digital world, namely that lonely people use the Internet in a way that displaces time spent in offline social activities rather than using it to make meaningful social connections. A longitudinal study of Finnish social media users found that problematic social media use predicted lower life satisfaction through loneliness (Marttila et al., 2021). It has been suggested that this is due to online social networks being devoid of quality or meaningful relationships. Nevertheless, digital contact can be particularly fulfilling for people with difficulties in the face-to-face environment, with benefits for people who feel lonely or experience social anxiety (Shaw & Gant, 2002).

Several interventions aimed at increasing opportunities for social interactions proved to be successful (although not panacea) for loneliness reduction (Masi et al., 2011). Yet, more specific research on the associations between intergroup interactions and loneliness is scarce. Tangentially supporting the role of intergroup contact specifically as a means for reducing loneliness comes from research that shows that intercultural contact and proficiency in majority language (which can facilitate contact) are strong predictors of reduced feelings of loneliness among adolescents of immigrant backgrounds (Neto & Barros, 2000). In addition, Ward and Masgoret (2004) found that lower frequency and quality of intergroup and intragroup contact predicted higher loneliness among American sojourners in Singapore. Zamir et al. (2020) showed that intergroup contact in the form of intercare home video calls (via Skype) tackled older adults' situational loneliness. Taken together, these studies suggest that face-to-face and digital (via SNS) intergroup contact should both be associated with less loneliness.

The Current Research

The current study extends the literature in three ways. Firstly, we empirically test whether digital intergroup (specifically, interethnic) contact via SNS is associated with social well-being indicators (i.e., diversity ideology, social self-efficacy, self-expansion, and loneliness) when tested directly against face-to-face contact. Secondly, we extend previous research by Lissitsa and Kushnirovich (2019) who tested whether digital and face-to-face contact are associated with reduced prejudice, we will examine both quantity and quality modes of digital and face-to-face contact as predictors of diversity ideology. Tapping on both quantity (measured with contact frequency) and quality (measured with perceived positivity) of intergroup contact can help disentangle the relationship between different modes of contact and social well-being indicators. Thirdly, we expand the literature by Cao and Meng (2020) teasing apart the interaction between face-to-face and digital contact by testing a model that investigates the moderating effect of quantity and quality of contact separately for face-to-face and digital contact. To take into consideration that people use social media to different degrees, and this is associated with several individual and attitudinal outcomes (e.g., Eşkisu et al., 2017; Rosen et al., 2013), we measured general social media usage and included it as covariate.

We acknowledge that social well-being encompasses various components (Breslow, 1972) and we chose to measure diversity ideology, social self-efficacy, self-expansion, and loneliness specifically. We believe these variables operationalize a range of affective and cognitive facets related to social well-being in the scope of interethnic contact, grounded on emerging empirical findings. We argue that, beyond its traditionally suggested effects on outgroup attitudes, interethnic contact is likely to produce a tertiary transfer effect (see Boin et al., 2021; Meleady et al., 2019), enhancing cognitive resources, skills, and identities that can be used to expand the self, feel more confident, connected to others, and have more positive beliefs surrounding diversity. This is in line with previous research that found interethnic contact to positively predict subjective well-being (Ye et al., 2023) and functional well-being (Bagci et al., 2014). Taken together, these variables tap on dimensions of social well-being particularly pertinent in intergroup contexts.

The current study tested the following hypotheses:

Hypothesis 1: Quantity and quality of both face-to-face and digital (via SNS) intergroup contact will be positively associated with diversity ideology, social self-efficacy, self-expansion, and negatively associated with loneliness.

Hypothesis 2: When all forms of intergroup contact are tested as simultaneous predictors, quality and quantity of face-to-face contact will be the strongest predictors of the outcome variables (positively predicting diversity ideology, social self-efficacy, and self-expansion, and negatively predicting loneliness).

Hypothesis 3: Face-to-face intergroup contact (both quantity and quality) will moderate the relationship between digital contact (both quantity and quality) respectively and the outcome variables. Specifically, under lower levels of quantity/quality of face-to-face contact, quantity/quality of digital contact will be associated with the outcome variables (positively predicting diversity ideology, social self-efficacy and self-expansion, and negatively predicting loneliness).

METHOD

Participants and Procedure

Researchers recruited a convenience sample to participate in an online study on digital and face-to-face intergroup contact. Participants were recruited via social media calls and university research credit systems. Ethical approval for the study had been obtained by the departmental research ethics committee of the first author, prior to recruiting participants. Four hundred and fifty-three people participated; however, 55 responses were omitted due to data being less than 50% complete. In inviting participants, we indicated that we were looking for people who are users of Facebook and Instagram. The final sample consisted of 398 participants, 105 of whom identified as male and 293 as female. The mean age of participants was 22.16 years (SD = 4.86). The majority of the sample was comprised of British nationals (n = 299), while the rest of participants were from Europe (n = 69), South Asia (n = 19), South America (n = 8), Africa (n = 2), and Australia (n = 1). Upon completion of the online questionnaire, participants were thanked and debriefed.

Measures

A correlational design was employed to test the relationships between the four modes of intergroup contact and the outcome variables.

Predictor Variables

Quantity of face-to-face contact. This was measured using a 2-item, 7-point Likert scale (adapted from Voci & Hewstone, 2003). The items were: "How many people from different ethnic groups do you know in person?" (*none-more than 20*) and "How frequently do you have face-to-face contact with people from different ethnic groups to you?" (*never-always*) (r = .60, p < .001).

Quantity of digital contact. The same 2-item, 7-point Likert scale for face-to-face contact (adapted from Voci & Hewstone, 2003) was adapted to reflect digital intergroup contact. The items were: "How many people from different ethnic groups do you know on your social media platform(s)?" and "How frequently do you have digital contact with people from different ethnic groups?" (r = .44, p < .001).

Quality of face-to-face contact. A 7-point, bipolar scale asked participants to characterize their contact with people from a different ethnicity to themselves (based on Wright et al., 1997). The scale consisted of five pairs of adjectives (e.g., superficial-deep; natural-forced, reverse item). Items were coded so that higher scores indicated higher quality of face-to-face intergroup contact (Cronbach's α = .80).

Quality of digital contact. The scale was similar to that measuring quality of face-to-face contact (based on Wright et al., 1997), adapted to include digital contact. Participants were asked: "When you see

someone from a different ethnicity to you on social media, in general do you find the contact…?," followed by the same five pairs of adjectives (e.g., superficial-deep; natural-forced) (Cronbach's α = .72).

Outcome Variables

Diversity ideology. Seven items (adapted from Adesokan et al., 2011) were used to measure diversity ideology. Items were measured on a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*), where higher scores indicated more positive diversity ideology. Example items are: "It is easier to solve problems in the country (politics, economy) if there is input from people who are different from each other," "Too many people from different cultural backgrounds can be a recipe for trouble" (reverse item) (Cronbach's α = .89).

Social self-efficacy. Sixteen items were used to measure social self-efficacy (adapted from Fan & Mak, 1998). Items were measured on a 7-point Likert scale ranging between 1 (*strongly disagree*) to 7 (*strongly agree*), where higher scores indicated more social self-efficacy. Example items are: "If I see someone I would like to meet, I go to that person instead of waiting for him or her to come to me," "I do not handle myself well in social gatherings" (reverse item) (Cronbach's α = .90).

Self-expansion. Twelve items were used to measure self-expansion (adapted from Paolini et al., 2016). Items were measured using a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*), where higher scores indicated more self-expansion. Example items are: "Engaging socially with other people results in me having new experiences," "My social relationships do not help me accomplishing new things" (reverse item) (Cronbach's α = .88).

Loneliness. Six items were used to measure loneliness (based on Russell et al., 1978), on a 5-point Likert scale that ranged from 1 (*strongly agree*) to 5 (*strongly disagree*). Example items are: "I am unhappy doing so many things alone," "I have nobody to talk to." Higher scores indicated higher loneliness (Cronbach's α = .80).

Control Variable

General social media usage. The degree of general social media usage (GSMU) was measured with nine items (based on Rosen et al., 2013), on a 7-point Likert scale ranging from 1 (*never*) to 7 (*all the time*). Participants were asked: "How often do you do each of the following activities on social networking sites such as Facebook and/or other social media platforms such as Instagram?," and activities included: "Comment on postings, status updates, photos," "Browse profiles and photos." Higher scores indicated more social media usage (Cronbach's α = .88).

RESULTS

Descriptives and correlations between all variables can be found in Table 1. In line with Hypothesis 1, both quantity and quality of digital and face-to-face contact were positively associated with diversity ideology, social self-efficacy, and self-expansion. Moreover, both quantity and quality of face-to-face and quality of digital contact were significantly negatively associated with loneliness, however quantity of digital contact was not significantly associated with loneliness.

TABLE 1
Means, standard deviations, and correlations for all variables

	M(*SD*)	1	2	3	4	5	6	7	8
1. GSMU	4.29 (1.11)								
2. Quantity face-to-face	4.91 (1.49)	.15**							
3. Quality face-to-face	5.08 (0.98)	.11*	.41***						
4. Quantity digital	4.54 (1.51)	.23***	.66***	.41***					
5. Quality digital	4.64 (1.04)	.06	.33***	.59***	.38***				
6. Diversity ideology	5.48 (1.11)	.15**	.42***	.47***	.34***	.31***			
7. Social self-efficacy	4.52 (0.98)	.06	.22***	.20***	.22***	.20***	.10*		
8. Self-expansion	4.02 (0.61)	.07	.39***	.45***	.33***	.33***	.48***	.32***	
9. Loneliness	2.48 (0.85)	.03	–.17**	–.19***	–.08	–.15**	–.15**	–.51***	–.29***

Note. GSMU = general social media usage.
*p < .05; **p < .01; ***p < .001.

Main Analysis

In the main analysis, we sought to determine whether quality and quantity of digital contact predicted diversity ideology, social self-efficacy, self-expansion, and loneliness, directly against quality and quantity of face-to-face contact, using IBM SPSS Amos 28. We included the paths from the four modes of contact (quantity and quality of face-to-face and digital contact) to the four outcome variables (diversity ideology, social self-efficacy, self-expansion, and loneliness) and controlled for general social media usage to the four modes of contact. Figure 1 shows the significant paths in the model. The model showed good fit as indicated by $\chi^2(4) = 5.12$, $p = .28$; RMSEA = .03; CFI = .99; and TLI = .99.

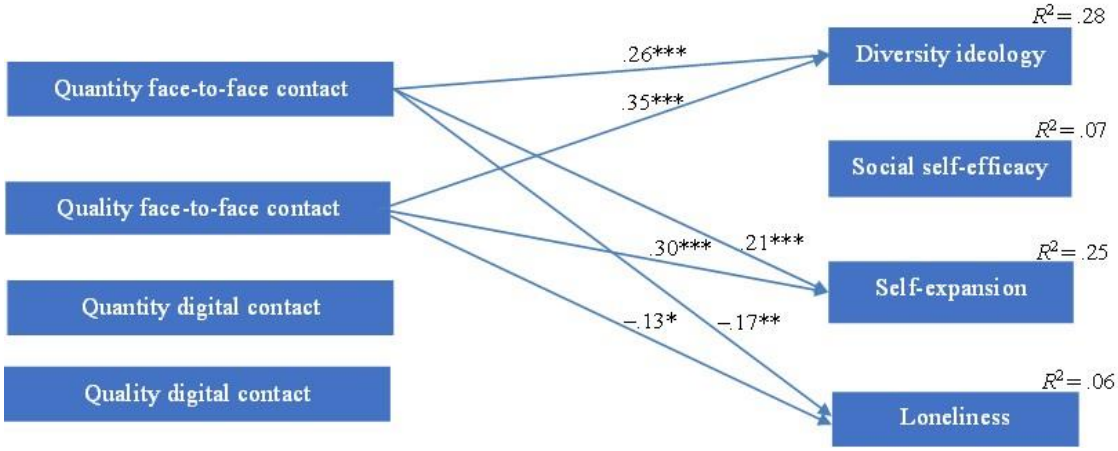

FIGURE 1
Quantity and quality of face-to-face versus digital contact (via SNS) as predictors of diversity ideology, social self-efficacy, self-expansion, and loneliness, controlling for general social media usage

Note. Only significant standardized coefficients are reported. Correlations among variables: quantity of digital contact with quality of digital contact ($r = .38$***), quality of face-to-face contact ($r = .41$***), quantity of face-to-face contact ($r = .66$***), and social media usage ($r = .23$***); quantity of face-to-face contact with quality of face-to-face contact ($r = .41$***), quality of digital contact ($r = .33$***), and social media usage ($r = .15$**); quality of face-to-face contact with quality of digital contact ($r = .59$***) and social media usage ($r = .11$*); social media usage with quality of digital contact ($r = .06$); diversity ideology with social self-efficacy ($r = –.04$), self-expansion ($r = .29$***), and loneliness ($r = –.05$); social self-efficacy with self-expansion ($r = .23$***), and loneliness ($r = –.49$***); self-expansion with loneliness ($r = –.22$***).
*$p < .05$; **$p < .01$; ***$p < .001$.

Entering all four modes of contact at the same level as simultaneous predictors of the outcome variables, the results indicated mixed support for our hypotheses. Quality and quantity of face-to-face contact both predicted diversity ideology and self-expansion; both quantity and quality of face-to-face contact also negatively predicted the loneliness. However, neither quality nor quantity of digital contact significantly predicted the social well-being outcomes. Unexpectedly, none of the contact modes significantly predicted social self-efficacy.

To further explore the significant associations between modes of contact and the outcome variables, differences between coefficients were tested based on the method suggested by Cumming (2009). According to this method, beta coefficients are significantly different if the respective 95% confidence intervals overlap by less than 50%. With respect to diversity ideology and self-expansion, the results revealed that the standardized beta weights of contact quality and contact quantity were not statistically significantly different (for both outcome variables, $p > .05$). With respect to loneliness, the results showed that the standardized beta weight of contact quantity was statistically significantly stronger than that of contact quality ($p < .05$).

Moderation Analysis

To test the interaction between digital and face-to-face contact, moderation analyses were conducted using PROCESS 3.1 Model 1 with 5,000 bootstrap resamples and 95% bias-corrected confidence intervals. For all moderations, we controlled for the other modes of contact and general social media usage.[1 2] Variables were mean centred and a total of eight moderations were run separately for the outcome variables for quantity and quality of contact. Figure 2 shows the conceptual model that we tested.

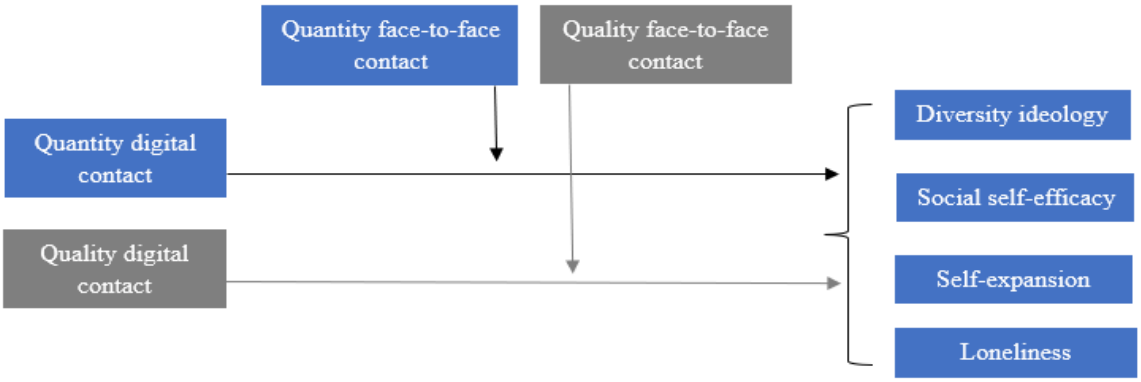

FIGURE 2
Conceptual diagram of the proposed theoretical model, in which (quantity and quality of) face-to-face contact moderates the relationship between (quantity and quality, respectively, of) digital contact and positive diversity ideology, loneliness, social self-efficacy, and self-expansion

There were no significant moderations when quantity of face-to-face contact was tested as the moderator between quantity of digital contact and diversity ideology, social self-efficacy, self-expansion, and loneliness (see Table 2 for model parameters).

TABLE 2
Moderation interaction of quantity of face-to-face contact with quantity of digital contact and social well-being outcomes

Outcome variable	Interaction $F(df)$	R^2	Confidence interval
Diversity ideology	0.51 (6, 391)	.002	[–.02, .15]
Self-expansion	0.23 (6, 391)	< .001	[–.02, .03]
Social self-efficacy	1.07 (6, 391)	.002	[–.02, .06]
Loneliness	0.37 (6, 391)	< .001	[–.05, .02]

The model for quality of face-to-face contact as the moderator revealed a significant interaction between digital and face-to-face contact for positive diversity ideology, $t(391) = –2.72$, $p = .007$, and for self-expansion with an interaction of $t(391) = –3.20$, $p = .002$; see Table 3 for overall model parameters. For every one unit increase in quality of face-to-face contact there was a $b = .36$ increase in diversity ideology, $t(391) = 5.70$, $p < .001$; however quality of digital contact was not directly associated with an increase in diversity ideology, $b = .07$, $t(391) = 1.12$, $p = .266$ (see Figure 3). By contrast, both quality of digital, $b = .08$, $t(391)$

= 2.28, p = .023, and face-to-face b = .17, $t(391)$ = 4.70, p < .001 contact significantly predicted an increase in self-expansion (see Figure 4).

TABLE 3
Moderation interaction of quality of face-to-face contact
with quality of digital contact and social well-being outcomes

Outcome variable	Interaction $F(df)$	R^2	Confidence interval
Diversity ideology	28.61(6, 391)**	.302	[–.20, –.30]
Self-expansion	24.39(6, 391)***	.272	[–.12, –.03]
Social self-efficacy	1.39 (6, 391)	.003	[–.03, .14]
Loneliness	0.91	.002	[–.04, .11]

**p < .01; ***p < .001.

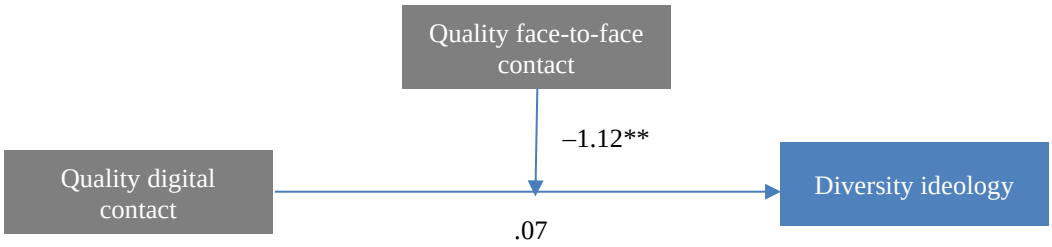

FIGURE 3
Quality of face-to-face contact moderates the effect of quality
of digital contact on positive diversity ideology
**p < .01.

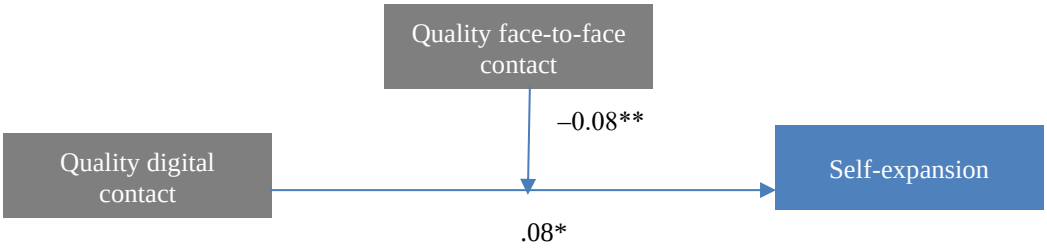

FIGURE 4
Quality of face-to-face contact moderates the effect of quality of digital contact on self-expansion
*p < .05; **p < .01.

Probing the interactions between quality of digital and face-to-face contact on diversity ideology and self-expansion, analyses were conducted at low (one *SD* below the mean), average and high (one *SD* above the mean) levels of the moderator. Results indicated that at low levels of quality of face-to-face contact, quality of digital contact was significantly and positively related to diversity ideology — t = 2.13, p = .034; CI [.01, .35] — and self-expansion — t = 3.20, p = .002; CI [.06, .25]. Quality of digital contact was also

significantly positively related to self-expansion at average levels of quality of face-to-face contact — t = 2.25, p = .023; CI [.01, .15].

Discussion

This study aimed to expand intergroup contact research by testing quantity and quality of face-to-face versus digital (via specifically SNS) intergroup contact simultaneously in relation to social well-being indicators. Results demonstrated that quality and quantity of intergroup contact in both the digital (via SNS) and physical setting were positively correlated with social well-being. When, however, testing all forms of contact as simultaneous predictors (controlling for general social media usage), the key role of face-to-face contact was highlighted, while digital contact via SNS did not significantly predict the social well-being outcomes. Specifically, quality and quantity of face-to-face contact positively predicted diversity ideology, self-expansion and negatively predicted loneliness. The association between quantity of face-to-face contact and loneliness was in fact stronger than that of quality. However, in the case of diversity ideology and self-expansion, the respective associations with face-to-face contact quality and quantity were not significantly different. Further, supporting the role of digital contact (via SNS), moderation analyses indicated that when quality of face-to-face contact was low, quality of digital contact was positively associated with diversity ideology. Additionally, quality of digital contact positively associated with self-expansion at low and average levels of quality of face-to-face contact. It is worth acknowledging that although the purpose of this research was to simultaneously test the four predictors (both face-to-face and digital contact quality and quantity), the descriptive statistics demonstrate that these variables correlate strongly. Therefore, it is possible that in the model we tested, covariation between the predictive variables has partly influenced the results, obscuring any other relationships that exist.

The findings of this study point to the importance of face-to-face contact in not only associating with positive diversity ideology but also providing the tools, skills, and resources that allow self-growth and lower feelings of isolation. Unexpectedly, the results showed that even face-to-face intergroup contact did not predict social self-efficacy. Perhaps a measure of contact self-efficacy (e.g., Bagci et al., 2020; Stathi et al., 2011) instead of the more general social self-efficacy would have been more directly related to intergroup contact as measured here, as it has been suggested that self-efficacy should be constructed and measured as domain-specific (Bandura, 2006).

The results of the moderation analysis extend previous findings that direct contact moderates the effect of online contact in an intergroup setting (Cao & Meng, 2020). Specifically, the finding that at low and average levels of quality of face-to-face contact, digital contact positively predicts diversity ideology and self-expansion is noteworthy. This is in line with literature that advocates SNS as a powerful tool to expand one's network and reduce negative feelings toward people who are different to oneself (see, for example, Walther et al., 2010). It is also compatible with research that suggests digital interactions can strengthen intercultural networks even when there is little to no direct contact with an outgroup (Cao & Meng, 2020); and with the general contact literature, which shows indirect contact, such as extended contact, to be particularly effective when direct contact is low (e.g., Vezzali et al., 2017). Digital contact via SNS may be a more convenient application to promote positive diversity ideology in situations of real-life segregation, not only physically but psychologically, making digital contact a critical alternative for people that may be constrained in having face-to-face contact experiences.

Although the results were not completely consistent with our hypotheses in that digital contact, when tested against face-to-face contact, did not have significant predictive power, caution is needed before we neglect to treat digital contact as a method to reduce prejudice and improve social well-being outcomes. To make a positive impact, an optimal combination of both quantity and quality of contact is required to reduce prejudice (Allport, 1954). Online networking may facilitate the quantity of intergroup contact to grow more easily than meeting people in the real world, but whether such online networks provide the sufficient depth of interaction to reduce prejudice toward the outgroup is more contentious. It is therefore important to establish when and how the digital environment can provide the quality of experience that can sufficiently reduce prejudice. For example, evidence that the Internet can facilitate high quality intergroup interactions derives from the electronic contact paradigm (e-contact; see White et al., 2021). E-contact is a synchronous, structured, and cooperative interaction based on texts between members from different groups and has been found to improve intergroup attitudes across a range of intergroup contexts (e.g., Bagci et al., 2021; White et al., 2019). Hence, particularly structured forms of positive digital contact may be necessary to be implemented, at least to prepare individuals for other forms of naturalistic intergroup contact that takes place both in digital and in-person settings.

It is important to address some limitations of this research, which may also help pave the path for future research. First and foremost, the correlational design of this research does not allow to infer causality among the variables, and we suggest caution when interpreting the results. Longitudinal designs will allow for more confidence in the direction of relationships between contact and social well-being variables and can highlight possible bidirectional relationships particularly between contact and contact-self-efficacy and contact and self-enhancement (Kauff et al., 2021; Paolini et al., 2016). In the current research we conceptualized self-expansion and social self-efficacy as potential outcomes of intergroup contact for a few reasons. Firstly, research has demonstrated that a bidirectional nature of contact exists among certain variables, for instance humanity attributions (Capozza et al., 2017) and outgroup attitudes (Meleady et al., 2021). In line with this, we believe that it is possible that contact experiences may have similar relations with social self-efficacy and self-expansion. Moreover, we suggest that this occurs through a tertiary transfer effect of contact to expand cognitive liberalization and social competence. We suggest that when people have positive contact experiences they will gain resources, skills, and identities that can be used to expand themselves, therefore social self-efficacy and self-expansion being an outcome of contact. This is in line with developmental psychology studies, which have also typically considered social and psychological well-being as outcomes, rather than predictors, of intergroup interactions (e.g., Bagci et al., 2014; Kawabata & Crick, 2008; Lease & Blake, 2005). Despite our rationale for this research, we reiterate the need to conduct longitudinal and experimental research that will shed further light on the relations among these variables.

Alternate advanced measures of intergroup contact such as the Contact Logger should be considered (Keil et al., 2020); the Contact Logger is an app designed to measure real time contact recording of interpersonal and intergroup encounters, in public and private spaces. This would enable a more comprehensive account of both face-to-face and digital intergroup contact, rather than relying on self-reported quality and quantity measures. Furthermore, in this research we focused on interethnic contact considering its links with subjective and functional well-being (Bagci et al., 2014; Ye et al., 2023) and the wider literature on tertiary effects. Future research could explore whether contact with other social groups, such as people with different sexual orientation or older people, is also associated with individual level outcomes of interest. Additionally, we measured specific aspects of social well-being that we argue are particularly relevant to intergroup contexts in line with tertiary effects of intergroup contact. Nevertheless, social well-being is multifaceted (Breslow, 1972) and future research could explore further dimensions of it. We also acknowledge that we used a convenience sample in this study. Further research in this field would benefit from collecting data from

targeted populations that may be more (or less) likely to benefit from intergroup contact, or representative samples that may speak to the generalizability of findings.

In our research, we focused on digital intergroup contact via SNS. However, people interact digitally with others via different means, such as online games with other people, messaging applications and structured interventions. Therefore, digital contact here was limited to social media, and the results cannot readily generalize to other forms of digital contact. Whether SNS can form a deep and social capital-filled relationship may be media-type dependent (Cummings et al., 2002; Harwood, 2021). For example, on Instagram, image is a defining feature of how people portray themselves on the platform image salience may actually increase intergroup barriers (in line with social identity theory; Tajfel & Turner, 1986). Other online platforms, such as Zoom or Microsoft Teams, allow a more direct and synchronous interaction between individuals, where one may choose to present their image or not. Such platforms are endorsed by educational and work institutions as collaborative tools, so may have a further advantage in supporting positive interactions. As such, future research should investigate whether digital contact between different online platforms may have a bearing on intergroup relations and psychological well-being modalities.

In this study we did not consider individual differences as possible moderating factors of the contact — social well-being paths. Future research should, for example, investigate the role that personality traits (e.g., Vezzali et al., 2017) and self-esteem have in determining the extent to which face-to-face or digital contact predict social well-being indicators. People with lower self-esteem may, for example, gain more social capital through using SNS than people with higher self-esteem (Tazghini & Siedlecki, 2013). Furthermore, our research did not attempt to explain why the different modes of contact predict the outcome variables. That is, we did not look into possible mediators that may explain the effects of face-to-face contact, over and above those of digital contact. A key mediating mechanism in the contact literature, for example, is intergroup anxiety (Pettigrew & Tropp, 2008; Stephan & Stephan, 1985). It would be interesting to see if reductions in intergroup anxiety are facilitated to greater extent by face-to-face than digital contact.

Conclusion

The current study aimed to expand intergroup contact theory by considering the direct comparison between face-to-face and digital contact via SNS, both in terms of quantity and quality, as predictors diversity ideology, self-efficacy, self-expansion, and loneliness. The results provide evidence that the benefits of intergroup contact are strongest in the face-to-face (rather than digital, and specifically SNS) world. However, when quality of face-to-face contact is limited, digital contact via SNS may be critical in enhancing diversity ideology and self-expansion. As people spend more time online, it is necessary to continue investigating when and how various modes of intergroup contact can be maximally effective.

Notes

1. The pattern of results remained the same when general social media usage was not included as covariate.
2. The pattern of results remained the same when the other modes of contact were not included as covariates.

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