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Positive and negative intergroup contact in school and out-of-school contexts: A longitudinal approach to spillover effects

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Abstract

This study aims to tackle positive and negative intergroup contact in school and out-of-school contexts to test whether a spillover effect (i.e., the extent to which experiences that individuals have in one context spill over into another) applies to intergroup contact. Participants were 984 adolescents (M_{age} = 14.66; 62.7% female; 24.8% ethnic minority). Results indicated that positive contact in school was related over time to higher positive contact in out-of-school contexts and vice versa (i.e., *valence consistent spillover effect*). Positive contact in school was linked over time to lower negative contact in out-of-school contexts (i.e., *valence inconsistent spillover effect*). Overall, this study provides novel insights into the transmission of adolescents' intergroup contact across socialization contexts by emphasizing the leading role of positive contact in schools.

KEYWORDS
adolescence, negative contact, out-of-school context, positive contact, school context, spillover effect

INTRODUCTION

International migration over the last decades has amplified the possibility of interacting with members of different ethnic and cultural groups (i.e., intergroup contact; Allport, 1954; International Organization for Migration, 2021). Such progressive diversity could be conceived as a "double-edged sword" that can lead to beneficial outcomes, such as fostering cultural encounters and exchanges, but in some cases, to detrimental outcomes, such as prejudice (Crocetti et al., 2021). Intergroup contact is often proposed as one of the main strategies for curbing these undesirable outcomes and enhancing the development of inclusive attitudes, especially among adolescents (Tropp et al., 2022; Wölfer et al., 2016).

However, contact experiences are not necessarily positive. It is thus fundamental to take into consideration the *valence of contact* (i.e., positive or negative) in order to understand whether intergroup contact can promote social inclusivity or hinder it. Positive contact is often described in terms of warm, respectful, friendly, and pleasant interactions with outgroup members, while negative contact refers to distant, intimidating, unfriendly, and unpleasant interactions between the members of different groups (Hayward et al., 2017). So far, however, only a few longitudinal studies have simultaneously examined positive and negative contact experiences (e.g., Bagci et al., 2022; Prati et al., 2022), and most studies that have done so did not account for the role of different contexts in which contact may occur. Drawing from the ecological systems theory (Bronfenbrenner & Morris, 2006), positing that adolescents' development unfolds from the dynamic interplay of youth and their proximal and distal environments,

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this study sought to investigate the mutual associations between positive and negative contact experiences by considering socialization contexts in which youth might experience both forms of contact.

Family aside, there is hardly another context youth spend as much time in as in school, which has therefore been conceived as a significant developmental context throughout adolescence (Eccles & Roeser, 2011). In addition, schools also bring together young people from diverse ethnic and cultural backgrounds and are, therefore, also an important acculturative context (Schachner et al., 2018). Despite the growing knowledge concerning adolescents' intergroup contact experiences in schools (e.g., Karataş, Eckstein, et al., 2023), little is known about how young people can experience positive and negative forms of contact in out-of-school contexts (e.g., neighborhoods, public places, sports and leisure clubs; Bekhuis et al., 2013; Merrilees et al., 2018). Given this lack of knowledge, the current longitudinal study involving ethnic minority[1] and majority adolescents aimed specifically to examine mutual associations between intergroup contact in school and out-of-school contexts. More precisely, it sought to investigate the extent to which adolescents' positive and negative contact in school can spill over to out-of-school contexts and vice versa (i.e., *spillover effect*).

Intergroup contact theory

A main principle of intergroup contact theory (Allport, 1954) is that bringing different group members in a context where individuals experience face-to-face interactions under facilitative conditions (i.e., equal status, common goals, intergroup cooperation, and support of authorities) reduces ethnic prejudice by mitigating intergroup anxiety and increasing outgroup empathy (Pettigrew & Tropp, 2006, 2008). However, intergroup contact theory has also acknowledged that contact and its consequences are not always positive. For instance, negative contact may prevail in certain circumstances characterized by factors such as ethnocentrism or perceived threat (e.g., Crocetti et al., 2021; Stephan et al., 2008), which in turn could worsen intergroup relations. Thus, it is important to tackle both the positive and negative valence of contact by underlining their differential impacts on various intergroup outcomes (e.g., Schäfer et al., 2021).

Indeed, a seminal study by Barlow et al. (2012) highlighted the necessity of considering both facets of contact separately by indicating more substantial adverse effects of negative contact on prejudice and intergroup attitudes compared to the beneficial influence of positive contact (i.e., positive–negative contact asymmetry; see also Prati et al., 2021). Similarly, Aberson (2015) highlighted this differential pattern by reporting that negative contact was more strongly related to the cognitive dimensions of prejudice, like stereotypes, while positive and negative contact were similarly related to the corresponding positive or negative affective dimensions of prejudice, such as intergroup emotions. Nevertheless, these varying effects of positive and negative contact might also be balanced by the fact that contact differs not only in valence but also in frequency. More specifically, *intergroup contact quantity* refers to the frequency of interactions that individuals have with outgroup members. Importantly, positive contact is usually experienced more often than negative contact (Graf et al., 2014; Hayward et al., 2017). This is especially the case for females, who report more positive and less negative contact compared to males (Bagci & Gungor, 2019).

While the literature highlighted the complex pattern of effects stemming from intergroup contact, the possible influences of socialization contexts in which positive and negative contact may occur have been mostly neglected (for exceptions, see Bekhuis et al., 2013; Christ et al., 2014; Landmann et al., 2022). Ecological systems theory (Bronfenbrenner, 1977, 1979) provides a comprehensive framework for examining adolescents' intergroup contact experiences across socialization contexts as it underlines that the development of youth is closely embedded in multiple nested systems. The microsystem includes proximal contexts in which adolescents have day-to-day interactions, such as family, schools, or leisure activities, whereas the mesosystem pertains to the interplay of adolescents' microsystems. The exosystem encompasses contexts where youth may not directly belong to, which still exert influence, while the macrosystem involves overarching cultural and societal contexts. These interconnected systems lead to dynamic changes influenced by the temporal metric and the historical context, representing the chronosystem (Bronfenbrenner & Morris, 2006). Youth development should therefore be considered against the background of the dynamic interplay between these nested systems. Building upon this theoretical grounding, positive and negative intergroup contact experiences can occur simultaneously across various socialization contexts and be affected by their interplay.

Of youth's proximal socialization contexts, schools offer a variety of opportunities for intergroup contact (for a review, see Thijs & Verkuyten, 2014). Greater ethnic and cultural diversity in school classes was found to be positively linked to cross-ethnic friendships, which reflect a very robust form of positive contact (Davies et al., 2011). Thus, ethnically and culturally diverse schools can be a place of positive contact experiences that can foster empathy and reduce anxiety or stress (Tropp et al., 2022). However, they can also be a place of negative contact and its undesirable outcomes (e.g., victimization), especially in highly diverse classrooms in which negative attitudes toward ethnic minority students are endorsed (Bayram Özdemir et al., 2018). Herein, harmonious intergroup contact

[1]Adolescents who were themselves born outside of the destination country or with at least one parent who was born outside of the destination country (European Commission, 2020).

interactions may be very likely when schools are perceived as a place where equal status and cooperative interdependence between groups (i.e., facilitative contact conditions; Allport, 1954; Pettigrew & Tropp, 2006) can be promoted by institutional diversity norms and the support of formal authorities (e.g., Karataş, Eckstein, et al., 2023). Thus, the specific way in which adolescents perceive their school environment might affect the overall quality of adolescents' contact experiences.

Besides school, adolescents can experience positive and negative intergroup contact in different *out-of-school contexts* (Thijs & Verkuyten, 2014). So far, to the best of our knowledge, only a few studies (e.g., Bekhuis et al., 2013; Landmann et al., 2022) have simultaneously addressed positive and negative contact within and outside of school. Both studies examined the extent to which positive and negative contact affect intergroup attitudes, such as perceived ethnic distance (Bekhuis et al., 2013), and tested whether these effects depend on the context in which contact occurred (Landmann et al., 2022). Although the findings of these studies emphasized the role of context in shaping the link between contact and attitudes, the interplay between positive and negative contact within and across contexts remains largely in the shadow. Thus, it might be of great interest to unravel how adolescents can experience positive and negative contact in school and out-of-school contexts and, more importantly, to what extent contact engaged within one setting may reinforce or hamper contact experiences in another setting.

The spillover effect

The concept of *spillover* refers to the phenomenon according to which experiences that individuals have in one context affect those enacted in another setting (Almeida et al., 1999). This phenomenon was originally studied in adulthood, considering what happens when individuals spill over problems from work to the family context (e.g., Schulz et al., 2004). Subsequently, it has been used as a heuristic concept to understand adolescents' experiences across multiple contexts, such as family, peers, and school (e.g., del Toro et al., 2023; Flook & Fuligni, 2008). For example, it was shown that young people transfer how they resolve conflicts with their parents at home to conflict resolutions in peer contexts (van Doorn et al., 2011). Similar to these relational practices, spillover process might also apply to intergroup contact experiences.

A deeper understanding of how intergroup contact experiences may be transferred across contexts can be further drawn from the theoretical premises of the *affect-matching hypothesis* (Barlow et al., 2019), which postulates that positive or negative contact is closely linked to its congruent affections, whether positive or negative. In detail, one's positive intergroup contact is more closely related to higher intergroup warmth than to lower intergroup anger, whereas one's negative contact is more closely linked to higher anger than to lower warmth (Barlow et al., 2019). Following this line of thought, adolescents' positive contact in one context (e.g., school) might lead to more warmth, empathy, and trust toward the members of ethnic and cultural outgroups not only in the same but also in another context. Through these affections, youth might develop more positive intergroup attitudes that would lead them to engage in more positive contact with individuals from various outgroups in other socialization contexts. Correspondingly, an initial negative contact in a given setting might exacerbate detrimental intergroup attitudes by triggering intergroup anger, anxiety and curbing outgroup empathy and trust (e.g., Árnadóttir et al., 2018; Hayward et al., 2017). Hence, youth may likewise transfer their negative contact from one context to another. In both cases, a *valence consistent spillover effect* would be detected.

In contrast, it has also been shown that positive contact dampens detrimental intergroup outcomes (e.g., anxiety and anger; Hayward et al., 2017; Swart et al., 2011), whereas negative contact could diminish outgroup empathy, warmth, and trust either directly (Barlow et al., 2019; Hayward et al., 2017) or indirectly by lowering the beneficial effects of positive contact (e.g., openness to seek further contact; Árnadóttir et al., 2022). These findings suggest an interdependence of positive and negative contact. Applied to the school context it was correspondingly found that positive contact reduced negative intergroup contact at a later time point and vice versa, for both ethnic minority and majority students (Karataş, Eckstein, et al., 2023). Hence, spillover effects may appear from one context to another not only within the same valence of contact but also across valences. That is, when ethnic minority and majority adolescents have positive intergroup contact in one context, this may lead them to engage in less negative contact in another context and vice versa. The same pattern might also appear for adolescents' negative contact across contexts. In both cases, *a valence inconsistent spillover effect* would occur.

So far, most research on context-specific intergroup contact experiences focused on the level of structural diversity (e.g., Christ et al., 2014). Notably, disentangling valence consistent and inconsistent spillover effects of positive and negative contact may pave the way for a deeper understanding of how "context matters" in youth's intergroup relations by highlighting the interconnectedness of various socialization settings (Landmann et al., 2022). In this way, the role of adolescents' socialization contexts and their interplay in building harmonious intergroup relations may be further unveiled.

The current study

In light of the literature reviewed above, the current longitudinal study sought to examine whether the spillover effect applies to the transmission of the adolescents' positive and negative intergroup contact across school and

out-of-school contexts. Given the possible consistency between adolescents' positive and negative intergroup contact across contexts (i.e., *valence consistent spillover effect*), it was hypothesized that adolescents' positive contact in school is positively related over time to their positive contact in out-of-school contexts and vice versa (*Hypothesis 1a*). Similarly, adolescents' negative contact in school is positively linked to their negative contact in out-of-school contexts over time and vice versa (*Hypothesis 1b*). Considering that adolescents' positive or negative contacts in one context are not solely mirrored in the same valence (positive or negative) in another context (i.e., *valence inconsistent spillover effect*), it was further expected that adolescents' positive contact in school is inversely associated over time with their negative contact in out-of-school contexts and vice versa (*Hypothesis 2a*). Furthermore, adolescents' negative contact in school is assumed to be inversely related over time to their positive contact in out-of-school contexts and vice versa (*Hypothesis 2b*).

In comparison, stronger effects of within-school contact experiences (positive and negative) might be expected than of out-of-school contact. Adolescents spend most of their time in school. Moreover, due to institutional policies around cultural diversity, schools may also provide more favorable conditions for positive contact than out-of-school contexts. However, given the lack of empirical knowledge on this matter, the present study chose an exploratory approach (*Exploratory Research Question*) to the question of relatively stronger effects of within-school contacts.

While the present study focused on whether spillover effects were driven by contact itself rather than the frequency of contact, the effect of quantity of contact in both contexts was still taken into account, in addition to further socio-structural variables (i.e., ethnic background, gender, and classroom ethnic diversity) that have been found to be related to intergroup contact.

METHOD

Participants

Participants in this study were drawn from a larger longitudinal research project, Developing Inclusive Identities in Adolescence. Adolescents attending seven different high schools (i.e., lyceum, technical, and vocational high schools) located in small (about 25,000 inhabitants), medium (about 97,000 inhabitants), and large (about 150,000 inhabitants) cities in the North-East of Italy agreed to participate in this study at three different time points (*T*s), with a 6-month interval between them. The students were in their first year of high school at T1 and their second year at T2 and T3.

The final longitudinal sample included 984 adolescents (62.7% female; $M_{age} = 14.66$, $SD_{age} = 0.73$, age range: 14–17 years at T1) who participated in at least two waves of the data collection (76.0% of the total sample; for more information, see the sample attrition section). The sample consisted of two groups: 740 ethnic majority (64.7% female; $M_{age} = 14.58$, $SD_{age} = 0.67$, age range: 14–17 years at T1) and 244 ethnic minority (56.6% female; $M_{age} = 14.90$, $SD_{age} = 0.84$, age range: 14–17 years at T1) adolescents. As for family structure, most participants (76.9%) indicated that they came from two-parent families, 21.7% reported that their parents were separated or divorced, and 1.4% indicated other family situations (e.g., one deceased parent). Almost all participants (97.5%) were living with one or both parents. Parents' educational titles were as follows: 37.0% of fathers held less than a high school diploma, 50.1% held a high school diploma, and 12.9% held a university degree; 27.3% of mothers held a lower qualification than a high school diploma, 49.2% held a high school diploma, and 23.5% held a university degree.

Among the ethnic minority participants, 74.6% were second-generation immigrants who were born in Italy, while the others were first-generation immigrants who had been living in Italy for an average of 7.5 years ($SD = 5.1$, range: 6 months–15.5 years) at T1. Among second-generation immigrant adolescents, most parents migrated from other European countries (43.2% and 53.7% of fathers and mothers, respectively), with Albania being the most frequent country of origin. The remaining parents migrated from Africa (19.9% and 18.4% of fathers and mothers, respectively); Asia (3.3% and 4.1% of fathers and mothers, respectively); North, Central, and South America (4.6% and 6.2% of fathers and mothers); and the Middle East (0.8% and 0.4% of fathers and mothers). Of the first-generation migrants, 67.7% were born in other European countries, with Romanians, Ukrainians, and Albanians being the most represented groups. The rest of the first-generation migrants were born in Africa (17.7%), Asia (8.1%), and North, Central, and South America (6.5%). The ethnic composition of the current sample is consistent with recent official migration statistics in Italy, showing that there are more second-generation than first-generation immigrants in the total student population and that the largest groups are adolescents of Romanian and Albanian backgrounds (Ministero dell'Istruzione – Ufficio Statistica e Studi, 2021; United Nations, 2019). With regard to reasons for migration, the majority of participants reported that their parents had migrated to improve their family's economic situation (35.2% and 29.5% of fathers and mothers, respectively), for family reunification (7.8% and 23.4% of fathers and mothers, respectively), other reasons (e.g., to study, to escape war; 3.6% and 6.9% of fathers and mothers, respectively), or did not answer this question (53.4% and 40.2% of fathers and mothers, respectively).

Overall, data attrition was modest across time. The missing items in the final longitudinal sample ranged from 7.8% to 19.2% across the three time points. Findings of Little's (1988) Missing Completely at Random (MCAR) test revealed a normed χ^2 (χ^2/df) of 1.39, indicating that data were likely missing at random. Therefore, all participants in the final longitudinal sample ($N = 984$) were

included in the analyses, and missing data were handled through the full information maximum likelihood procedure (Kelloway, 2015).

Procedure

This study was approved by the Ethics Committee of the Alma Mater Studiorum University of Bologna (Italy). In order to administer a questionnaire during regular class hours, permission from the school principals was obtained. Thereafter, adolescents were contacted to inform them about the study and to ask for their active assent to participate. Participants received oral and written information about the study and were asked to sign the informed consent form. In addition to the active youth assent, active parental consent was obtained by sending the parental consent forms at least 1 week before the data collection date. Both active youth assent and parental consent were obtained from almost all (96.6%) of the approached students and their parents.

At each time point, all teachers were informed by the school principals about the project and the scheduled time of data collection. The teachers could then decide whether to stay in or leave the classroom during the questionnaire administration. The data collection at T1 (May 2019) and T2 (November 2019) was completed through the same paper-and-pencil questionnaire in classrooms during school hours, whereas the data collection at T3 (May 2020) was completed via an online version of the questionnaire during regular class hours since the teaching activities had been continued in remote mode due to the COVID-19 pandemic. In both versions of the questionnaire (i.e., paper-and-pencil and online), each participant generated a unique code in order to link the participant's responses across the three waves while ensuring confidentiality. Participation in this longitudinal study was voluntary, and students could choose not to complete the questionnaire at each time point and participate in other school activities instead.

Measures

Adolescents filled out a questionnaire containing measures of acculturation, intergroup contact, identity, and psychosocial adjustment as part of the longitudinal research project. Socio-demographic questions (e.g., birth country [0 = *Italy*, 1 = *other*], the birth country of parents [0 = *Italy*, 1 = *other*]) and measures of positive and negative contact as well as the quantity of contact (for both school and out-of-school contexts) were used in this study.

Positive and negative intergroup contact in school and out-of-school contexts

Adolescents' positive and negative contact in school and out-of-school contexts were assessed with the Intergroup Contact Interactions Scale (ICIS; Karataş, Rubini, et al., 2023). Initially, participants were asked to think about their *own* interactions with outgroup members in the school context [out-of-school contexts such as public places, sports groups] during the last 6 months by providing the following explanation: "The following questions are about interactions you may have had in school [out-of-school] with people of foreign origin [Italian people]. Now think about the interactions you had in the last six months at school [out-of-school]". Thereafter, participants were asked to provide their answers to the instrument that consisted of 10 items scored on a 5-point Likert-type rating scale ranging from 1 (*never*) to 5 (*very often*). The same items were repeated twice to measure adolescents' positive and negative intergroup contact in school and out-of-school contexts separately. Sample items include: "They have been polite to you" (positive contact; five items) and "They have been rude to you" (negative contact; five items).

In the validation study (Karataş, Rubini, et al., 2023), the ICIS was found to show an excellent two-factor structure (i.e., positive and negative contact) in both school and out-of-school contexts, and measurement invariance across ethnic minority and majority adolescents was also established. In order to further support the distinction between valence and contexts, a confirmatory factor analysis (CFA) with four latent factors (i.e., positive contact in school, negative contact in school, positive contact in out-of-school context, and negative contact in out-of-school contexts) and 20 observed indicators (five per latent factor) was conducted in the present study. The CFA results indicated a good fit for the four-factor model ($\chi^2 = 672.231$, $df = 164$, CFI = .928, TLI = .917, SRMR = .048, RMSEA [90% CI] = .062 [.057, .067]). Standardized factor loadings ranged from .715 to .865 and from .637 to .797 for positive and negative contact in schools, respectively. In out-of-school contexts, they ranged from .850 to .940 and from .753 to .855, for positive and negative contact, respectively (for detailed information, including item wordings in English and Italian, see Table S1).

Quantity of intergroup contact in school and out-of-school contexts

The quantity of adolescents' intergroup contact was measured by using a single item ("In the past six months, have you met and talked with people of foreign origin [Italian people] at school [out-of-school]?") on a 5-point Likert-type rating scale (1 = *never*, 5 = *very often*). This item was repeated twice to assess contact quantity separately in school and out-of-school contexts.

Covariates

Participants' ethnic background (0 = *ethnic majority*, 1 = *ethnic minority*), gender (0 = *male*, 1 = *female*), and classroom ethnic diversity were treated as covariates.

TABLE 1 Means (*M*), standard deviations (*SD*s), and Cronbach's alpha coefficients (*α*) at each time point.

	Time 1			Time 2			Time 3		
	M	*SD*	*α*	*M*	*SD*	*α*	*M*	*SD*	*α*
School context									
Quantity of contact	4.087	1.021		3.829	1.160		3.695	1.177	
Positive contact	4.085	0.766	.900	4.039	0.827	.940	4.057	0.808	.946
Negative contact	1.613	0.706	.846	1.649	0.747	.895	1.690	0.754	.896
Out-of-school contexts									
Quantity of contact	3.479	1.261		3.536	1.251		3.465	1.241	
Positive contact	3.791	1.025	.956	3.859	0.937	.962	3.875	0.960	.961
Negative contact	1.613	0.760	.902	1.669	0.785	.920	1.740	0.825	.919

Ethnic background was identified based on the birth countries of participants and their parents. Classroom ethnic diversity was calculated by means of Simpson's index of ethnic diversity[2] (Simpson, 1949; see also Graham et al., 2014). This index indicates the odds that two randomly chosen students in a particular classroom would have different ethnic backgrounds, with values ranging from 0 to 1. A higher score reflects more classroom diversity. In this study, the average value was .43 (range: .00–.84), indicating moderate levels of diversity across classrooms.

RESULTS

Preliminary analyses

Means, standard deviations, and Cronbach's alpha coefficients are reported in Table 1. As can be seen, participants reported more positive than negative contact in both school and out-of-school contexts. Additionally, bivariate correlations among study variables are presented in Table S2.

Preliminary analyses were conducted to test hierarchical levels of longitudinal measurement invariance in M*plus* 8.6 (Muthén & Muthén, 1998–2017) using the maximum likelihood estimator with robust standard errors (MLR estimator; Satorra & Bentler, 2001). The results indicated measurement invariance across all levels (i.e., configural, metric, and scalar; van de Schoot et al., 2012) for positive and negative contact in school and out-of-school contexts (examined separately), as well as for the total measurement model (see Table S3).

Main analyses

To test valence consistent and inconsistent spillover effects, cross-lagged panel models were estimated. In detail, (a) cross-lagged paths controlling for (b) stability paths (T1→T2, T2→T3), (c) within-time correlations among all study variables (at T1, and correlated changes at T2 and T3), and (d) the covariates (i.e., ethnic background, gender, and classroom ethnic diversity) were estimated. Because students were nested within classrooms, the "type = complex" command available in M*plus* was used, specifying classrooms as the cluster variable, in order to adjust standard errors.[3]

To establish a parsimonious model, time invariance of (a) cross-lagged effects (T1→T2, T2→T3), (b) correlated changes at T2 and T3, and (c) covariates' effects (T1→T2, T1→T3) was tested. Model fit was evaluated considering multiple criteria: The Comparative Fit Index (CFI) and Tucker–Lewis Index (TLI), with values higher than .90 indicative of an acceptable fit and values higher than .95 indicative of excellent fit; the Standardized Root Mean Square Residual (SRMR) and the Root Mean Square Error of Approximation (RMSEA), with values less than .08 indicating acceptable fit and values less than .05 representing excellent fit (Byrne, 2012). Furthermore, a 90% confidence interval (CI) for the RMSEA was taken into account, whereby model fit can be considered acceptable if the upper bound of this CI is lower than .10 (Chen et al., 2008).

To conclude that nested models, which compared a parsimonious, restricted model to a complex, non-restricted model, were not different from each other, at least two of the following three criteria must be met: non-significant $\Delta\chi^2_{SB}$ (Satorra & Bentler, 2001), ΔCFI < −.010, and ΔRMSEA < .015 (Chen, 2007; Cheung & Rensvold, 2002). As

[2]While calculating this index, the numbers of cultures represented in each class were identified based on the information on adolescents' and their parents' birth countries. If adolescents were born in a country other than Italy (i.e., first-generation immigrants), adolescents' birth countries were also considered in addition to their parents' birth countries. However, if adolescents were born in Italy (i.e., second-generation immigrants), only parents' birth countries were considered. When one parent was born in Italy, the birth country of the foreign-born parent was considered only. Mixed cultures were recorded with separate labels. For instance, if a student was born in Greece and the parents were born in different countries (e.g., Italy and Albania), a new label was created for this participant (e.g., Greece–Albania).

[3]Intraclass correlations were calculated based on the nested structure of the data. The findings revealed low between-group variance with values ranging from 0.019 to 0.111 (average = 0.051) at T1, from 0.028 to 0.161 (average = 0.073) at T2, and from 0.003 to 0.116 (average = 0.047) at T3.

TABLE 2 Cross-lagged models: Model fit indices and model comparisons.

Models	Model fit indices						Model comparison				
	χ^2	*df*	CFI	TLI	SRMR	RMSEA [90% CI]	Models	$\Delta\chi^2_{SB}$	Δdf	*p*	ΔCFI	ΔRMSEA
M1: Baseline model	5285.005	2162	.921	.914	.060	.038 [.037, .040]						
M2: Model with time invariance of cross-lagged paths	5341.195	2192	.920	.915	.062	.038 [.037, .040]	M2-M1	54.865	30	.004	−.001	.000
M3: Model with time invariance of cross-lagged paths and T2– T3 correlations	5340.924	2207	.920	.916	.063	.038 [.037, .039]	M3-M2	11.301	15	.731	.000	.000
M4: Model with time invariance of cross-lagged paths, T2–T3 correlations, and covariate effects	5361.604	2225	.920	.916	.063	.038 [.037, .039]	M4–M3	20.455	18	.308	.000	.000

Abbreviations: CFI, comparative fit index; *df*, degrees of freedom; RMSEA [90% CI], Root Mean Square Error of Approximation and 90% Confidence Interval; SRMR, Standardized Root Mean Square Residual; TLI, Tucker–Lewis Index; Δ, change in the parameter; χ^2_{SB}, Satorra–Bentler scaled chi-square.

displayed in Table 2, the results indicated that time invariance could be established for all cross-lagged paths, correlated changes, and covariates' effects (i.e., M4). The model results are presented in Table 3, and the significant standardized estimates of cross-lagged effects are displayed in Figure 1.

The model results revealed that all stability paths and most of the within-time correlations were significant (see Table 3). As for the *valence consistent spillover effect*, adolescents' positive intergroup contact in school was related over time to relatively higher levels of positive contact experiences in out-of-school contexts and vice versa (*Hypotheses 1a*). This finding indicates that youth with more positive contact in one context at T1 experienced more positive contact in another context at a later time than those who reported less positive contact in the initial context at T1. However, contrary to expectations (i.e., *Hypotheses 1b*), bidirectional over time associations could not be detected for adolescents' negative contact across contexts. Thus, a valence consistent spillover effect was supported only for adolescents' positive contact experiences.

Partially in line with the *valence inconsistent spillover effect* hypotheses, the results showed that adolescents' positive contact in school was related to relatively lower levels of negative contact in out-of-school contexts at later time points (i.e., T1–T2 and T2–T3; *Hypothesis 2a*). Yet, the longitudinal associations between adolescents' positive contact in out-of-school contexts were not significantly linked to negative contact in school context over time. Besides, there were no valence inconsistent spillover effects of participants' negative contact experiences over time (*Hypotheses 2b*).

In addition, results indicated that valence consistent spillover effects were more pronounced for the direction from school to out-of-school contexts (*Exploratory Research Question*). More precisely, the effects of positive contact in school on the positive contact in out-of-school contexts were significantly stronger than vice versa (Wald test = 4.555, $df = 1$, $p = .032$). However, this pattern could not be replicated for the valence inconsistent spillover effect. That is, the effects of positive contact in school context on negative contact in out-of-school contexts were not significantly different from the effects of positive contact established in out-of-school contexts (Wald test = .000, $df = 1$, $p = .988$). The effects of negative contact were not tested for differences as they were insignificant.

The results further pointed to positive bidirectional associations between the quantity of adolescents' intergroup contact in school and out-of-school contexts (see Table 3). More importantly, the quantity of contact in out-of-school contexts was linked to higher positive and negative contact in the corresponding context. However, these over time associations were not significant for the school context. Altogether, these findings indicate that the frequency of contact was only linked to positive and negative contact in out-of-school settings across time.

As for the covariates' effects (see Table 3), ethnic minority adolescents reported not only a higher frequency of overall

TABLE 3 Standardized estimates of the cross-lagged model.

Stability paths	T1→T2	T2→T3
Quantity of contact in school	.268***	.330***
Positive contact in school	.397***	.383***
Negative contact in school	.336***	.281**
Quantity of contact out-of-school	.428***	.392***
Positive contact out-of-school	.288***	.270***
Negative contact out-of-school	.262**	.282***
Cross-lagged paths	T1→T2	T2→T3
Positive contact in school→Negative contact in school	−.103*	−.106*
Positive contact in school→Quantity of contact in school	.051	.052
Positive contact in school→Quantity of contact out-of-school	.068	.073
Positive contact in school→Positive contact out-of-school	.205***	.206***
Positive contact in school→Negative contact out-of-school	−.088*	−.087*
Negative contact in school→Positive contact in school	−.077	−.079
Negative contact in school→Quantity of contact in school	.000	.000
Negative contact in school→Quantity of contact out-of-school	.014	.015
Negative contact in school→Positive contact out-of-school	.032	.032
Negative contact in school→Negative contact out-of-school	.097	.096
Quantity of contact in school→Positive contact in school	.034	.036
Quantity of contact in school→Negative contact in school	−.008	−.009
Quantity of contact in school→Quantity of contact out-of-school	.067**	.072**
Quantity of contact in school→Positive contact out-of-school	−.015	−.015
Quantity of contact in school→Negative contact out-of-school	.005	.005
Quantity of contact out-of-school→Positive contact in school	.027	.025
Quantity of contact out-of-school→Negative contact in school	.055	.051
Quantity of contact out-of-school→Quantity of contact in school	.170***	.156***
Quantity of contact out-of-school→Positive contact out-of-school	.112**	.100**
Quantity of contact out-of-school→Negative contact out-of-school	.094*	.083*
Positive contact out-of-school→Positive contact in school	.144**	.123**
Positive contact out-of-school→Negative contact in school	−.045	−.039
Positive contact out-of-school→Quantity of contact in school	−.007	−.006
Positive contact out-of-school→Quantity of contact out-of-school	.021	.019
Positive contact out-of-school→Negative contact out-of-school	−.122*	−.100*
Negative contact out-of-school→Positive contact in school	−.010	−.010
Negative contact out-of-school→Negative contact in school	.094	.094
Negative contact out-of-school→Quantity of contact in school	−.015	−.015
Negative contact out-of-school→Quantity of contact out-of-school	.022	.023
Negative contact out-of-school→Positive contact out-of-school	−.108*	−.105*
Covariate effects[a]	T1→T2	T1→T3
Ethnic background→Quantity of contact in school	.217***	.210***
Ethnic background→Positive contact in school	.029	.028
Ethnic background→Negative contact in school	.058*	.056*
Ethnic background→Quantity of contact out-of-school	.229***	.230***
Ethnic background→Positive contact out-of-school	.108***	.101***
Ethnic background→Negative contact out-of-school	−.010	−.009
Gender→Quantity of contact in school	.030	.029
Gender→Positive contact in school	.104***	.101***
Gender→Negative contact in school	−.135***	−.131***

TABLE 3 (Continued)

Gender → Quantity of contact out-of-school	.019	.019	
Gender → Positive contact out-of-school	.080***	.076***	
Gender → Negative contact out-of-school	−.110***	−.102***	
Classroom ethnic diversity → Quantity of contact in school	.137***	.132***	
Classroom ethnic diversity → Positive contact in school	.013	.012	
Classroom ethnic diversity → Negative contact in school	.050	.049	
Classroom ethnic diversity → Quantity of contact out-of-school	.057*	.057**	
Classroom ethnic diversity → Positive contact out-of-school	.024	.022	
Classroom ethnic diversity → Negative contact out-of-school	.028	.026	
Within-time correlations	T1	T2	T3
Positive contact in school ↔ Negative contact in school	−.607***	−.431***	−.395***
Positive contact in school ↔ Quantity of contact in school	.409***	.430***	.434***
Positive contact in school ↔ Quantity of contact out-of-school	.270***	.184***	.181***
Positive contact in school ↔ Positive contact out-of-school	.529***	.455***	.413***
Positive contact in school ↔ Negative contact out-of-school	−.535***	−.333***	−.303***
Negative contact in school ↔ Quantity of contact in school	−.092**	−.080*	−.080*
Negative contact in school ↔ Quantity of contact out-of-school	−.018	−.072**	−.071**
Negative contact in school ↔ Positive contact out-of-school	−.301***	−.245***	−.221***
Negative contact in school ↔ Negative contact out-of-school	.682***	.756***	.683***
Quantity of contact in school ↔ Quantity of contact out-of-school	.437***	.328***	.353***
Quantity of contact in school ↔ Positive contact out-of-school	.308***	.232***	.230***
Quantity of contact in school ↔ Negative contact out-of-school	−.060	−.141***	−.140***
Quantity of contact out-of-school ↔ Positive contact out-of-school	.615***	.492***	.478***
Quantity of contact out-of-school ↔ Negative contact out-of-school	−.033	−.061	−.060
Positive contact out-of-school ↔ Negative contact out-of-school	−.380***	−.378***	−.338***

Abbreviation: *T*, Time.

[a]Participants' ethnic background (0 = *ethnic majority*, 1 = *ethnic minority)* gender (0 = *male*, 1 = *female).*

*$p < .05$.; **$p < .01$.; ***$p < .001$.

contact but also more negative and positive contact, respectively, in school and out-of-school contexts than their majority peers. In addition, females indicated more positive and less negative contact in both contexts than males. In contrast, classroom ethnic diversity did not relate to the valence of contact, but it was related to a higher frequency of contact in both contexts.

DISCUSSION

In adolescence, young people increase their experiences of intergroup contact in both school and out-of-school contexts (Thijs & Verkuyten, 2014). Even though much attention has been paid to intergroup contact in schools (e.g., Schachner et al., 2015; van Zalk et al., 2021), the mutual dynamics between adolescents' positive and negative intergroup contact in school and out-of-school contexts has remained rather underexplored. Therefore, by adopting a context-dependent approach, the present study disentangled (a) a valence consistent spillover effect by demonstrating the transmission of adolescents' positive (but not negative) contact from one context to another; (b) a valence inconsistent spillover effect by highlighting that adolescents' positive intergroup contact in school may impede to establish negative intergroup contact in out-of-school settings; and (c) more substantial effects of adolescents' positive contact in schools in driving positive contact in out-of-school contexts. These findings altogether align with the ecological systems theory (Bronfenbrenner, 1977, 1979) as they emphasize how ethnic minority and majority adolescents could simultaneously experience positive and negative contact within different microsystems and, most importantly, reflect how contact experiences in such microsystems are intertwined with each other.

Valence consistent and inconsistent spillover effects of positive contact

The current study supports the assumption that a spillover phenomenon (Flook & Fuligni, 2008) can be extended to adolescents' positive intergroup contact across school and out-of-school contexts. As expected (*Hypothesis 1a*), positive contact in school was linked to relatively more positive intergroup contact in out-of-school contexts over time and vice versa. These findings might open up a new avenue

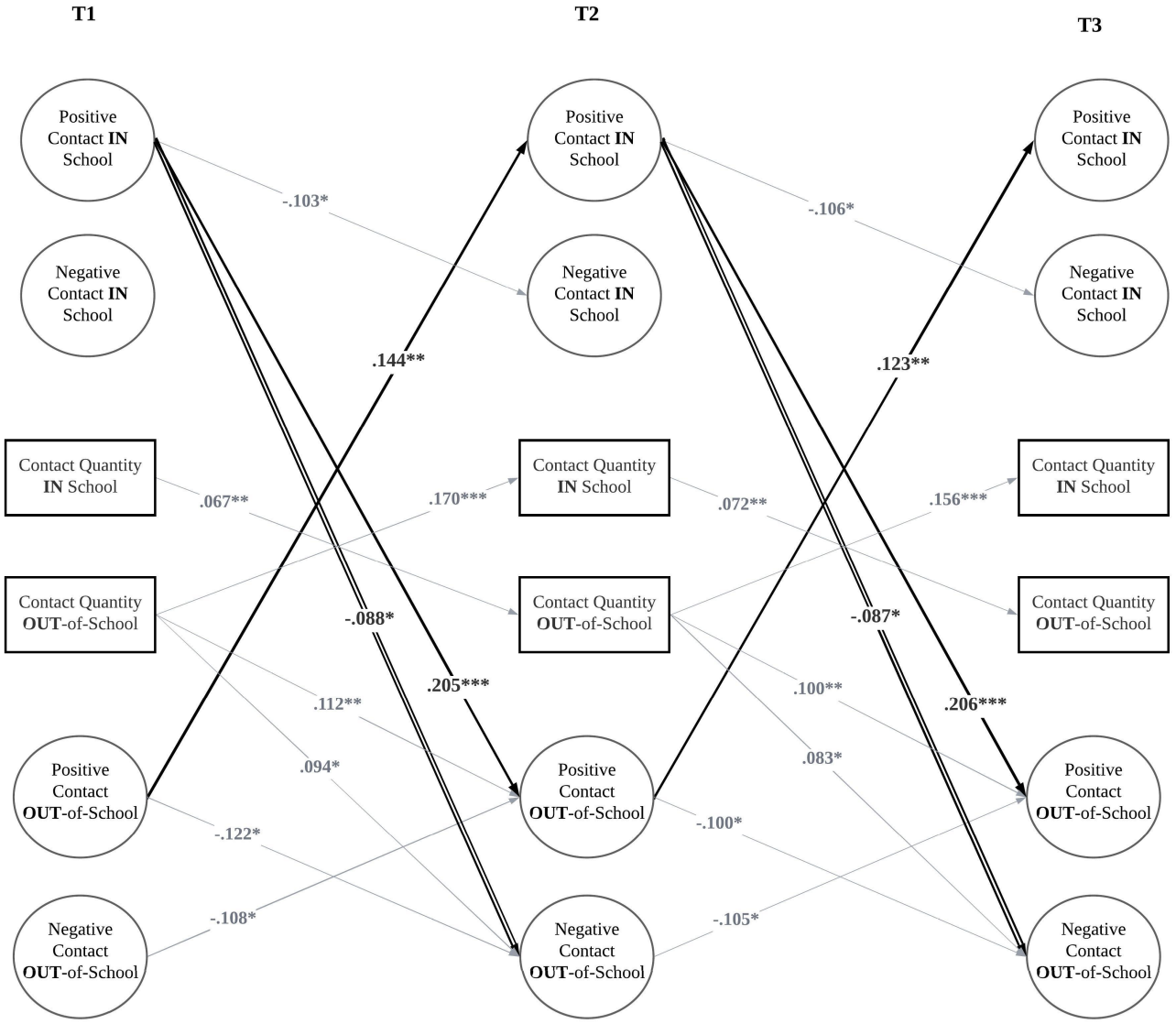

FIGURE 1 Standardized model results. For the sake of clarity, only significant standardized estimates of cross-lagged effects are displayed. Bold arrows indicate valence consistent spillover effects, whereas double-line arrows display valence inconsistent effects. *T*, Time. **p* < .05; ***p* < .01; ****p* < .001.

regarding adolescents' *approach* and *avoidance* tendencies toward further encounters (Paolini et al., 2018; see also Kauff et al., 2021) by elucidating the relative importance of prior positive contact experiences in a certain setting. It could be argued that the opportunity to have more positive contact in one environment could pave the way to seek further positive contact in another environment. Recent longitudinal research on adolescents has indeed supported this argumentation, indicating that increases in positive contact are related to desirable changes in both approach and avoidance tendencies (Bagci et al., 2022). Further studies should, therefore, consider the potential mediating role of the contact approach and avoidance tendencies (Paolini et al., 2018) to help unravel the underlying mechanism of how contact experiences spill over from one context to another.

Furthermore, the findings regarding the valence consistent spillover effects also imply the possibility of expanding the generalization of contact effects, which postulates that the effects of one's positive contact may influence attitudes toward the same outgroup as a whole and even another group not involved in the contact (i.e., primary and secondary transfer effects; Al Ramiah & Hewstone, 2013; Boin et al., 2021). In this respect, it might be possible for adolescents to transfer their positive contact from one context to another through developing positive intergroup attitudes, which they have already set based on their contacts with specific ethnic and cultural outgroups in a particular context. This points to a possible beneficial behavior–attitude chain that can improve youth's intergroup relations with different outgroup members from various socialization contexts. Hence, future research might consider specific ethnic and cultural outgroups with whom adolescents could be in contact within and across certain socialization contexts (e.g., school, neighborhood) to expand the understanding of how the generalization of positive contact and their outcomes works.

Moreover, the current work partially supported the valence inconsistent spillover hypothesis by indicating that adolescents' positive intergroup contact in school dampened their negative intergroup contact in out-of-school contexts over time (i.e., *Hypothesis 2a*). In other words, adolescents experienced relatively less negative contact in out-of-school settings when they had established more positive contact within school. Considering that negative contact can be more distinctive and memorable than positive encounters (Hayward et al., 2017), these findings may be primarily interpreted by referring to the specific micro-level predictors of intergroup contact, such as self-expansion and self-efficacy in contact. On the one side, positive contact established in school, most likely in the form of cross-ethnic friendships, might function as a positive reward linked to self-expansion. This, in turn, could lead to maintaining current harmonious contact interactions and approaching further contact in out-of-school contexts (see, Kauff et al., 2021 for a review). On the other side, adolescents' cross-ethnic friendships might also pave the way to further close cross-ethnic friendships by improving their cross-ethnic self-efficacy (Bagci et al., 2020). The latter refers to the belief that one is able to build and maintain these friendships. Taken together, adolescents' positive contact within the relatively structured school settings could make adolescents more "contact ready" (Turner & Cameron, 2016) to establish harmonious interactions in other important out-of-school contexts by encouraging their self-motivation and self-efficacy. Consequently, young people might experience more positive and less negative intergroup contact in out-of-school contexts if they experience positive contact within schools. The potential role of these micro-level predictors intervening on spillover effects nonetheless awaits further investigation.

Interestingly, neither valence consistent nor inconsistent spillover effects could be detected for negative contact (i.e., *Hypothesis 1b* and *2b*). That is, adolescents' negative contact in one context was not related over time to positive or negative contact in another setting. This pattern was not expected and might be explained twofold. First, it might suggest that there is still considerable context specificity, which can be beneficial as negative interactions in one context do not necessarily carry over to another context. Second, this pattern may also be related to the disparity between the frequency and intensity of positive and negative contact (for a review, see Schäfer et al., 2021). Not only is positive contact more likely (e.g., Graf et al., 2014), but it might also be experienced with more emotional intensity (Hayward et al., 2017). Thus, a higher prevalence and perceived intensity of positive compared to negative contact may reduce the likelihood that negative experiences spill over.

Taken together, this study suggests that the valence consistent spillover effect of positive contact was supported in both school and out-of-school contexts. In addition, the valence inconsistent spillover effect appeared only for positive contact unfolding from the school context to out-of-school settings. Considering that the effects of contact quantity and socio-structural covariates were accounted for, the current findings indicate that valence consistent and inconsistent spillover effects might be due to the valence of contact itself.

The centrality of adolescents' positive contact in schools

The main implication of this study revolves around adolescents' positive contact established in school driving out-of-school contacts. These findings may speak of the central role of schools as one of the few contexts in which all students, irrespective of their ethnic and cultural backgrounds, can interact. Schools can play a central role in building social cohesion among adolescents belonging to diverse ethnic and cultural groups by offering a *secure environment* in which the most facilitative conditions for positive contact can be intentionally implemented. Schools can do so by promoting a climate in which all students are supported in establishing and maintaining contact and cooperation (Schachner et al., 2015; Tropp et al., 2022), are treated equally (Karataş, Eckstein, et al., 2023), and the diverse background of each student is valued within curricular and extracurricular activities (Schwarzenthal et al., 2018). Thus, positive contact in schools can function as a model for adolescents' intergroup relations that can be transferred to other contexts. School's potential as a conducive environment for nurturing harmonious interactions was further supported by the finding that positive contact enacted in school context spilled over to out-of-school contexts more strongly than the other way around.

However, the valence inconsistent spillover effects of positive contact in schools were not significantly different from those of positive contact in out-of-school contexts. Knowing that superficial ways of implementing cultural diversity policies might worsen the intergroup relations among students (Schwarzenthal et al., 2018), such ineffective practices could lessen the reducing impact of positive contact within school against those engaged in out-of-school contexts. These findings can still be viewed as an invitation for (re)considering how school diversity policies should be implemented to promote optimal contact conditions to ensure cohesive social environments for adolescents within and beyond schools. Accordingly, future research may address the extent to which both forms of spillover effects are contingent upon the ways of promoting school diversity policies through the fulfillment of optimal contact conditions.

Limitations and suggestions for future research

Inevitably, this study has limitations that should be addressed in future research. First, adolescents' positive and negative intergroup contact has been assessed by tapping

into the frequency of positive and negative contact in one specific (i.e., school) and one broader (i.e., out-of-school) context. However, both forms of adolescent contact might also vary across different out-of-school contexts such as neighborhoods, peer groups, and sports or other leisure clubs (Bekhuis et al., 2013; Landmann et al., 2022). In this respect, future studies examining adolescents' intergroup contact in specific out-of-school contexts could provide a more nuanced picture of the associations between positive and negative intergroup contact across multiple socialization contexts. As such, it might also be possible to gather a deeper understanding of the interplay between different microsystems for youth's psychosocial development within the specific lens of the intergroup contact theory.

Second, another drawback concerns the potential overlap of outgroup members that adolescents meet in school and out-of-school contexts. Obviously, some adolescents might experience either positive or negative contact with the same outgroup peers both in school and out-of-school contexts. Indeed, drawing on U.S. data, a recent study supports this idea by illustrating that the quality and stability of adolescents' cross-ethnic friendships improved if youth found opportunities to bond with outgroup members in schools and continued interacting with them outside of school (e.g., at each other's home; Lessard et al., 2019). Future studies should therefore account for potential overlaps in contact experiences across contexts.

Third, positive and negative contact experienced by ethnic majority youth were assessed without referring to specific immigrant outgroups. Because Italy has become a "home" for migrants from various ethnic groups, such as Romanians, Albanians, and Moroccans (United Nations, 2019), taking a more nuanced approach by accounting for specific cultural backgrounds might offer a better understanding of valence consistent and inconsistent spillover effects, revealing the potential generalization of contact effects.

Fourth, consistent with recent official statistics in Italy (Ministero dell'Istruzione – Ufficio Statistica e Studi, 2021), a majority of ethnic minority students in this study were second-generation migrants born in Italy and, accordingly, had a lifelong history of interactions with their non-immigrant peers. Hence, examining intergroup contact in another cultural context where more adolescents are first-generation immigrants (e.g., Ukrainian war refugees in Poland and Germany; United Nations High Commissioner for Refugees, 2022), with relatively fewer interactions with outgroup members, is important for future research.

Fifth, it should also be acknowledged that adolescents' positive and negative contact might be triggered by additional micro-, meso-, and macro-level factors, such as youth's personality, perspective taking, group status, history of conflict, or norms and shared goals within society (Kauff et al., 2021). It is possible such additional elements may enhance or diminish the probability of the spillover effects. Hence, future research should go a step further by considering these factors within the longitudinal dynamic of positive and negative contact across school and out-of-school contexts.

Last but not least, the present findings cannot be interpreted neglecting possible effects of the COVID-19 pandemic because the T3 data collection took place during the initial peak of the pandemic (in May 2020). More specifically, the first time lag included the period before the pandemic, while the second time lag included a period before and one after the onset of the pandemic. It is possible to assume that all adolescents could still experience intergroup contact over time. Yet, interactions might have taken different forms after the onset of the pandemic and occurred primarily online during class hours or through social media communications (Imperato et al., 2021; White et al., 2021). Future investigations are needed to examine whether the spillover effect applies alike when differentiating between in-person and online intergroup contact.

CONCLUSION

The present study provides preliminary insights into the applicability of the spillover phenomenon to adolescents' intergroup contact by revealing the transmission of positive (but not negative) contact across adolescents' socialization contexts and the predominant role of positive contact established in schools driving positive and negative contact in out-of-school contexts. Such findings support the notion that schools are the most fertile contexts (Tropp et al., 2022) for promoting school-based intervention programs to foster positive contact and cross-ethnic friendships (Karataş et al., 2021; Lessard et al., 2019), leading to social cohesion in contemporary societies (Reimer et al., 2021). In fact, as this study highlights, positive contact experienced in school can be transferred to other out-of-school contexts, and by doing so, it contributes to building more inclusive and cohesive societies.

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CONFLICT OF INTEREST STATEMENT
The authors declare that they have no conflict of interest.

DATA AVAILABILITY STATEMENT
The datasets generated and/or analyzed during the current study are not publicly available but are available from the first and/or corresponding author on reasonable request.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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