Journal of Experimental Social Psychology 72 (2017) 21–31

Contents lists available at ScienceDirect

Journal of Experimental Social Psychology

journal homepage: www.elsevier.com/locate/jesp

Can stateways change folkways? Longitudinal tests of the interactive effects of intergroup contact and categorization on prejudice☆,☆☆

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ARTICLE INFO

Keywords:
Intergroup contact
Categorization
Common Ingroup
Longitudinal
Multilevel analysis

ABSTRACT

This research examined how a predictable change in the social structure over time (from segregated to integrated) can affect the way intergroup contact and subjective categorization of ingroup and outgroup members (intergroup, superordinate, dual identity) impact on intergroup bias. A three-stage longitudinal study was conducted with six-month intervals (*N*s = 708, 435, 418) involving high school students in Germany. Time 1 (*T*1) was characterized by structural segregation and Times 2 and 3 (*T*2, *T*3) by structural integration. Longitudinal analysis between *T*1 and *T*2 showed that intergroup categorization (but not superordinate categorization or dual identity) improved intergroup relations. Between *T*2 and *T*3, dual identity reduced intergroup bias and marginally increased interpersonal closeness whereas superordinate categorization increased bias and reduced interpersonal closeness. There were no effects of intergroup categorization between *T*2 and *T*3. Overall, positive effects of contact increased over time, reaching significance from *T*2 to *T*3, supporting a *consolidation hypothesis* and intergroup contact theory more widely. These findings are also consistent with a *congruence hypothesis* that the impact of intergroup contact is partly determined by the match between how people categorize ingroup and outgroup members and the social structure that frames intergroup relations.

'Legislation cannot change mores'
(William Graham Sumner (1907), *Folkways*.)

Sumner's often misquoted conclusion that stateways cannot change folkways, has been contested by many sociologists and psychologists (e.g., Aronson, 1999). Experimental research, largely with university student participants, clearly demonstrates that multiple factors can increase or decrease prejudice. Moreover, in society, rendering certain practices illegal (such as smoking inside buildings) or sometimes creating new structures (e.g., switching between closed- and open-plan offices) can change behaviors, norms, and opportunities. A classic example is desegregation. In research on intergroup contact, there is a great deal of cross-sectional survey evidence that positive contact is linked to lower prejudice. However, there is a dearth of evidence regarding how, across periods or phases of structural or legislative change, contact and prejudice are related, and the role of potential mediating processes. The present research used a large field study to test hypotheses about how intergroup contact affects prejudice before and after a structural change from segregation to integration.

High-quality contact between members of different social groups is a well-established basis for reducing prejudice and stereotyping and improving intergroup relations (Brown & Hewstone, 2005; Pettigrew & Tropp, 2006). However, much of the literature tends to refer to the history of intergroup relations, the structure of the intergroup context, and the passage of time more generally simply as the background or context, rather than variables of interest in their own right. However, we believe that longitudinal or time-series research

☆ Anja Eller is at the Faculty of Psychology, UNAM; Dominic Abrams is at the Department of Psychology, University of Kent, UK; and Miriam Koschate is at the School of Psychology, University of Exeter, UK. This work was originally supported by a PhD studentship from the University of Kent and a British Academy (PDF/2002/214) Post-Doctoral Fellowship to the first author. We wish to thank the students, teachers, and principals of the nine participating high schools in Bonn, Germany.

☆☆ Some of the findings from the dataset have been presented as conference papers: Eller, A. & Abrams, D. (2002). From subgroups to a superordinate group: An inevitable merger and its consequences on intergroup attitudes. Paper presented at the 13th General Meeting of the European Association of Experimental Social Psychologists, San Sebastian, Spain, June 26–29, and Eller, A. & Abrams, D. (2002). Intergroup contact in schools: The roles of class identification and levels of categorisation. Paper presented at the British Psychological Society Social Psychology Section Annual Conference, Huddersfield, September 11–13.

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http://dx.doi.org/10.1016/j.jesp.2017.04.005
Received 28 November 2016; Received in revised form 19 April 2017; Accepted 19 April 2017

with a greater focus on the broader social structure is indispensable if we are to fully understand the role of contact in intergroup relations (Abrams & Eller, 2017).

This research explored the effects of contact over time when there is a legitimized transition in the intergroup structure, from segregation to integration. By 'legitimized', we mean an externally or officially sanctioned change in the social structure over which people have no control and which either constrains or enables intergroup contact. Specifically, we examined how school students' relationships with peers from their parallel classes change as those classes become integrated into a common grade. We also investigated the impact of this change in intergroup structure on participants' subjective categorization of former ingroup and outgroup members and how both subjective categorization and the quality of their intergroup contact affect important outcome variables specified in the literature. We examine interpersonal closeness, intergroup anxiety, intergroup bias, and desire for outgroup friendship.

1.1. Longitudinal studies of intergroup contact

Among the hundreds of studies during the past 60 years examining whether, how and when intergroup contact reduces prejudice and improves intergroup relations, only a small minority have been longitudinal (e.g., Binder et al., 2009; Brown, Eller, Leeds, & Stace, 2007; Christ et al., 2014; Dhont, Van Hiel, De Bolle, & Roets, 2012; Eller & Abrams, 2003, 2004; Stephan & Rosenfield, 1978; also see Enos, 2014, for a longitudinal field experiment). Of these, even fewer have included more than two waves of data collection. Including three or more time points is very laborious and often suffers from high participant attrition rates, but it is nonetheless important because it allows for the assessment of issues such as the stability of measures over time or full longitudinal mediation (cf. Schroeder & Risen, 2016; Swart, Hewstone, Christ, & Voci, 2011).

In one of the few multiple-time-point studies, Levin, van Laar, and Sidanius (2003) assessed the effect of contact on ingroup bias over five time points. Specifically, they found that UCLA college students of different ethnic groups who exhibited ingroup bias at the end of their first year had fewer outgroup friends during their second and third years. However, consistent with contact theory, students who had more outgrouped friends in college were more likely to have positive ethnic attitudes at the end of college. Finally, students who perceived the student body as a superordinate (common group), rather than as ingroups and outgroups had more outgroup friends.

Another study investigated Colored South African high school students' friendships with, and emotions, perceived outgroup variability and negative action tendencies towards the majority-status White South African outgroup (Swart et al., 2011). Three waves took place over a period of 12 months. Swart and colleagues found bidirectional relationships among contact, mediators (intergroup anxiety and affective empathy), and prejudice (cf. Eller & Abrams, 2003). Contact predicted increased empathy and decreased anxiety and prejudice over time. However, empathy also increased contact, and both intergroup anxiety and prejudice decreased contact. Even so, the longitudinal mediation was only present in the direction of contact (at Time 1) to prejudice (at Time 3) via empathy as well as anxiety (at Time 2), thus corroborating the contact hypothesis.

The current research, conducted with students in a school environment, was distinctive from most previous longitudinal studies of contact in several ways. Firstly, it incorporated three time points rather than two, allowing us to test temporal relationships with more confidence. Secondly, and more importantly, it examined the effect of contact across a period of known objective structural change in the intergroup context. We examined how this affects the relationships between contact, categorization, and intergroup relations. Although there are comparisons of different cross-sectional studies conducted with similar populations in different structural contexts (e.g., pre- and post-apartheid (Duckitt & Mphuthing, 1998; Pettigrew, 1960), or as minorities vs. majorities (Eller & Abrams, 2004), or before and after a terror attack (Abrams, Van de Vyver, Houston, & Vasiljevic, 2016), longitudinal tests of the same sample before and after a structural change are a rarity. Typically, structural change has been confounded with other major social changes in political constitution or ideology, namely, where institutional support for segregation has been challenged or regarded as non-legitimate (e.g., Duckitt & Mphuthing, 1998). In contrast, in the present study we examined how a change in the intergroup structure alone has an effect when aided by institutional support. That is, the change in structure is a normative transition that is externally sanctioned within a stable system. In sum, we examined changes in the same population across different structural circumstances.

1.2. Levels of categorization during intergroup contact

Three major models predict the forms of categorization that should result in optimal outcomes during intergroup contact. Hewstone and Brown (1986) proposed that intergroup contact should produce more general and important improvements when intergroup differences remain salient because this means the contact experience is not dismissed as involving atypical outgroup members (*intergroup level of categorization*). In contrast, Gaertner, Mann, Murrell, and Dovidio's (1989) recategorization model proposes advantages when people regard one another as part of a superordinate common group rather than members of distinct social groups (*superordinate level of categorization*). Finally, the *dual identity level of categorization* was formalized in Gaertner and Dovidio's (2000) Common Ingroup Identity Model (CIIM). Dual identity (Gaertner & Dovidio, 2000) constitutes an amalgam of salient categorization and recategorization, in which original group identities are maintained, but within the context of a superordinate identity. In intergroup contexts involving relatively large group memberships, such as nationality, the presence of a single, inclusive group identity may not optimally satisfy people's concomitant needs for distinctiveness as well as inclusion (Brewer, 1996). In these cases, a dual identity may be more potent in educing positive outgroup evaluations.

Evidence associated with the intergroup level is mixed. Increased category salience during contact — often operationalized as perceived typicality of the outgroup contact persons — has repeatedly been associated with higher intergroup bias, cross-sectionally (e.g., Eller & Abrams, 2003, 2004, 2006; Gaertner & Dovidio, 2000; Guerra et al., 2010; Stone & Crisp, 2007) and longitudinally (Eller & Abrams, 2004). On the other hand, intergroup categorization during contact has also been linked to more favorable outgroup attitudes, cross-sectionally (e.g., Brown, Maras, Masser, Vivian, & Hewstone, 2000; Brown, Vivian, & Hewstone, 1999; Voci & Hewstone, 2003; Wilder, 1984), longitudinally (Brown et al., 2007; Greenland & Brown, 1999), and experimentally (cf. Deschamps & Brown, 1983). Usually, this positive effect has taken the shape of an interaction with contact, such that contact only relates to less intergroup bias when group boundaries are salient, that is, when the intergroup level is high. Group salience also aids the generalization of positive contact effects, to different situations, to the outgroup as a whole, and even to uninvolved outgroups (Eller & Abrams, 2004; Pettigrew, 2009; Tausch et al., 2010).

Recategorization (i.e., a superordinate group level) and the concomitant dissolution of existing and meaningful social categories can sometimes be perceived as threatening to social identity and hence induce greater, instead of lesser, intergroup bias (González & Brown, 2003; Hornsey & Hogg, 2000a, 2000b; also see Hornsey & Hogg, 2002). For example, Hornsey and Hogg (2000b) investigated relations between humanities and science university students. They found greater bias among the subgroups when the common ingroup of university was made salient than when only the faculty subgroups were made salient. This finding resonates with initial discussions of CIIM. Gaertner, Dovidio, Anastasio, Bachman, and Rust (1993) argued that with real,

long-standing groups, members might be reluctant to forsake their subgroup identities in favor of a superordinate category. This is also one of the reasons why Hewstone and Brown (1986); Brown & Hewstone, 2005) advocated the benefits of keeping group boundaries salient instead of dissolving them altogether. Other research showing the potential negative effects of recategorization is work by Terry and colleagues, which found that mergers in organizational settings can be threatening, particularly for low-status groups (Giessner, Viki, Otten, Terry, & Täuber, 2006; Terry & O'Brien, 2001). Along similar lines, Wohl, Squires, and Caouette (2012) demonstrated that the potential loss of collective identity leads to collective *angst* (a term denoting the concern for the ingroup's future), which leads to ingroup protective attitudes and behaviors.

According to Pettigrew (1998), based on the CIIM, the superordinate level of categorization should be most beneficial in bringing about improved attitudes, emotions, and behavior towards outgroup members present in the contact situation. However, when a dual identity is salient, the superordinate component may be slightly less effective in producing positive attitudes in the immediate contact situation, but the salient categorization component should facilitate the generalization of contact effects to outgroup members uninvolved in the contact situation ("trade-off hypothesis"; Gaertner et al., 1993). Evidence for these tenets has also been provided in longitudinal studies (Eller & Abrams, 2004; Guerra et al., 2010; Sherif, Harvey, White, Hood, & Sherif, 1961). However, other studies have failed to detect a longitudinal link between superordinate or dual identity levels of categorization and subsequent intergroup attitudes (e.g., Eller & Abrams, 2003; Gleibs, Noack, & Mummendey, 2010; Hong et al., 2006). One reason for this missing longitudinal link might be the fact that previous longitudinal research has left the objective structure of the intergroup context unexamined.

1.3. Social structure

The literature shows that both intergroup and superordinate group levels have advantages and limitations in terms of improving intergroup relations. Yet, it remains unclear precisely *when* the intergroup level will be advantageous. We propose that the contribution of intergroup and superordinate categorization to changes in prejudice might also depend on the externally imposed structure of the intergroup context. When groups are clearly categorized as different and this is legitimized by institutional support (in Allport's, 1954, terms), it may be that people's acceptance and understanding of the intergroup structure attenuates tendencies towards prejudice. This is because members of the different groups understand the shared social reality and recognize that the intergroup structure is a necessary foundation for articulating meaningful and positive attitudes towards outgroup members (Hewstone & Brown, 1986; Oakes, Haslam, & Turner, 1994). Such a situation might be reflected by state-approved multiculturalism, or by federalism, for example, which support a 'live and let live' perspective on group differences.

In contrast, in situations in which there is institutional support for a common ingroup, it seems likely that matching this common ingroup by subjectively categorizing the groups at superordinate or dual identity levels would engender more favorable attitudes towards outgroup members. This reasoning is in line with Hong et al.'s (2006, Study 1) longitudinal research on the Hong Kong 1997 transition, which found that this impending political transition engendered a common ingroup of *the Chinese* in some people and this superordinate category led to more favorable outgroup attitudes over time.

Overall, we suggest that, in the absence of direct intergroup conflict, subjectively perceived levels of categorization are most likely to be influential in terms of reducing prejudice and intergroup bias when they match the intergroup structure. Hence, the intergroup level should be most effective under segregated conditions, because each group can retain uncontested positive distinctiveness for their ingroup. However, the superordinate group and dual identity levels should be most effective in an integrated group context because both groups gain positive social identity from the larger superordinate category. It is important to note that these predictions are intended to apply in a situation in which competitive intergroup biases are likely to be generated by an intergroup structure (e.g., through sports competitions and other opportunities for intergroup social comparison between different categories or groups) but in which there are institutional norms and support for comparatively harmonious intergroup relations and peace. As an example of such support, at some of the participating schools in the present research there was historical antagonism between parallel classes so school authorities had organized special seminars to deal with this problem. We do not assume that the influence of particular types of categorization would necessarily be the same in other contexts. For example, history has shown that institutional support for intergroup differences can also create or exacerbate intergroup bias when there is an ideological climate of inequality and dehumanization, as in Nazi Germany or during Apartheid.

1.4. Context of the research

The present research examined an educational context that presents an important externally imposed structural change. We focus on quality of contact rather than frequency of contact because frequency was generally involuntary and likely to show little variability whereas quality involves at least a subjective interpretation of the meaning and valence of contact, and some degree of active engagement. Moreover, the literature consistently shows that quality tends to have the largest impact on prejudice (Pettigrew & Tropp, 2006). From *T*1 to *T*2 (six months) we tested how quality of contact affects intergroup relations over a changing context (from segregation to integration). Then, from *T*2 to *T*3 (six months) we tested effects of contact in a constant (integrated) context. In the first phase of the study, there were relatively limited opportunities for contact, particularly during school hours. However, in the second phase the participants were given a sustained opportunity for direct contact as part of a unified group.

Participants were German high school (*Gymnasium*) students and we tested prejudice and contact in relations between school classes. Many German high schools divide their students into three to five different parallel classes within each grade. These categorizations are sometimes based upon pupils' foreign language preferences (e.g., to start learning English vs. Latin in Grade 5, the lowest grade), or other curricular choices. Despite the relative arbitrariness of these selections (and lack of any predictability as to which other pupils will share their classroom), students tend to identify rather strongly with their respective classes and, as mentioned above, there is often a certain level of interclass antipathy that has occasionally required intervention.

Of particular interest here is the change in the class system from grade 11 onwards. At grade 11 the class system is dissolved and students find themselves belonging to a single grade (*Jahrgangsstufe*) for the next two to three years. Students then take a specified number of mandatory and optional courses in which they may encounter a different composition of students, both from their former ingroup and their former outgroups. Hence, some students might establish quite high-quality contact from grade 11, whereas others might not. There is a strong emphasis on the common grade as the new ingroup, for example, students elect *one* representative for the whole grade. We surveyed students a few months before the end of grade 10 (*T*1), at the beginning of grade 11 (*T*2), and towards the middle of grade 11 (*T*3).

The main foci of this investigation were (a) to scrutinize the intergroup bias-reducing potential of subjectively perceived intergroup and superordinate levels of categorization, within an intergroup context that objectively changes structurally over time, and (b) to augment the scarce longitudinal research conducted on levels of categorization during contact (Eller & Abrams, 2004; Greenland & Brown, 1999) with evidence involving substantially more participants, more time points,

and a more extended time frame than has previously been the case. CIIM research often manipulates the intergroup structure cross-sectionally and tests the role of categorization as a mediator. In contrast, in the present research we focused on the temporal and structural factors that affect the contact-prejudice relationship (Abrams & Eller, 2017) by examining the two phases (segregation and integration) as different stages in a transitional intergroup structure. We were interested in how categorization affects intergroup relations directly and in combination with contact within these two phases.

1.5. Hypotheses

1.5.1. Effects of contact

Based on extensive theory and research into intergroup contact (e.g., Pettigrew & Tropp, 2006), we propose a temporal *consolidation hypothesis*. Specifically, over time we expect higher quality of contact to predict more positive intergroup relations (greater interpersonal closeness, lower intergroup anxiety, lower intergroup bias, higher desire for outgroup friendship with outgroup members). Given the likely increase in frequency and intensity of intergroup contact in the second, relative to the first phase of the study, we hypothesized that there will be more scope for differences in quality of contact to influence dependent variables in the second phase of the study (*T*2 to *T*3). Thus, contact will have more significant and stronger effects on dependent variables in Phase 2 than in Phase 1.

We recognize that some causal relationships are potentially circular. To evaluate this possibility, we also investigate the reverse causal direction between outcome and contact (e.g., does desire for outgroup friendship at *T*1 predict contact at *T*2, cf. Brown et al., 2007; Eller & Abrams, 2003, 2004; Levin et al., 2003).

1.5.2. Effects of categorization

Second, we propose a *congruence hypothesis*. Specifically, subjectively perceived levels of categorization will be most influential in terms of reducing intergroup bias when they are congruent with the externally legitimized intergroup structure. Hence, during Phase 1 of the study (*T*1 to *T*2) we expect that the extent to which participants initially categorize at the intergroup level will be most effective in improving all our outcome variables. In Phase 2 (*T*2 to *T*3), when the intergroup structure provides an overarching superordinate category, we expect to mainly observe an influence from superordinate and dual identity levels of categorization, both of which should be associated with reduced prejudice.

1.5.3. Interactive effects of contact and categorization

An implication of the congruence hypothesis is that the effects of contact might be larger when the *relevant* level of categorization is involved than when it is not. If this is correct, it could be reflected by an interaction between contact and levels of categorization. Specifically, in Phase 1 contact may be more effective at reducing intergroup bias and anxiety when participants view one another primarily in intergroup terms (i.e., with higher intergroup categorization). In Phase 2, when a superordinate structure exists, and given that participants might still be expected to retain a degree of identification with their original ingroup, we might expect positive effects of contact to be stronger when participants perceive superordinate categorization, or even more so, a dual identity. These hypotheses are somewhat speculative but are explored in the analyses that follow.

2. Method

2.1. Participants and procedure

Participants were high school students in Bonn, Germany (N = 708, 435, 418). The *T*1 analysis included 398 girls and 309 boys (one student did not report their sex) with an age range of 15–19 years (M = 16.7, SD = 0.70); 93.7% were of German nationality. The *T*2 analysis included 253 girls and 181 boys (one missing) with an age range of 15–19 years (M = 16.7, SD = 0.66). The *T*3 analysis included 245 girls and 172 boys (one missing) with an age range of 16–21 years (M = 17.7, SD = 0.70). The data were from an opportunity sample of all available schools within the region, and all eligible and available participants were recruited in order to attain power of at least 0.9 to detect a small effect size given the longitudinal design and uncertain attrition rate. Participating schools and class teachers gave their permission for this study to take place. In Germany, permission from parents is not needed as the schools have duty of care during school hours. No classes or students opted out of the data collection. All data were collected prior to commencement of data analyses. Data were collected at three time points, separated by six months, by means of questionnaires from all 33 classes available across nine schools. Class sizes averaged 20.1 children and at least three classes were drawn from each school.

As in any longitudinal study, participants age as the study progresses. Although participants are therefore 6–12 months older during Phase 2 of the study, we are aware of no theoretical or empirical basis for expecting developmental changes over this age range because most of the cognition-based changes in prejudice arise earlier in social development (see Bigler & Liben, 2007; Degner & Wentura, 2010; Rutland, Killen, & Abrams, 2010).

Completion of the questionnaire required approximately 25–40 min at *T*1 and 15–25 min at *T*2 and *T*3. On completion of the study participants were fully debriefed. A summary of the results was sent to each participating school.

2.2. Measures

The translation and back-translation (English to German) of the questionnaire was conducted by bilingual people (cf. Brislin, 1976). Our independent variable was quality of contact and levels of categorization, and the dependent variables were interpersonal closeness, desire for outgroup friendship, intergroup anxiety, and intergroup bias. Several other standard measures were included in the questionnaire but these were not focal to the hypotheses being tested in the present paper (Dunton & Fazio, 1997; Islam & Hewstone, 1993; Singelis, Triandis, Bhawuk, & Gelfand, 1995; Smith & Tyler, 1997; Stephan & Stephan, 1984; Wright, Aron, McLaughlin-Volpe, & Ropp, 1997). Further details are available in the Supplementary material.

2.3. Predictor variables

2.3.1. Quality of contact

We asked about the nature of contact with students from parallel classes: “Is the contact with students from your parallel classes…”, with items equal, pleasant, voluntary, intimate, and cooperative. Scaling ranged from *never* (1) to *always* (7), with higher scores denoting qualitatively better contact (see Eller & Abrams, 2003, 2004; Islam & Hewstone, 1993). Internal consistencies of the 5-item scale were satisfactory, with Cronbach's alphas 0.80 at *T*1, 0.82 at *T*2, and 0.84 at *T*3, respectively.

2.3.2. Levels of categorization

We used items adapted from Gaertner, Dovidio, and Bachman (1996); cf. Eller & Abrams, 2004) to measure levels of categorization. Participants were asked, “When you have contact with students from

Table 1
Changes of Means over Time.

Measure	*T*1 *N* = 708	*T*2 *N* = 435	*T*3 *N* = 418	*F* DF = 16, 191	Partial η^2
Quality of contact	4.59[a] (1.21)	4.91[b] (1.16)	5.11[b] (1.17)	13.31***	0.06
IG level of categorization	3.73[a] (1.58)	3.60[a] (1.68)	3.48[a] (1.72)	1.25	0.01
SO level of categorization	4.25[a] (1.67)	4.43[a] (1.62)	4.18[a] (1.63)	1.42	0.01
DI level of categorization	4.30[a] (1.75)	4.07[a,b] (1.68)	3.80[b] (1.65)	4.85**	0.02
Interpersonal closeness	2.62[a] (1.18)	2.99[b] (1.04)	3.14[b] (1.13)	17.30***	0.08
Intergroup anxiety	2.68[a] (0.88)	2.45[b] (0.91)	2.52[a,b] (0.93)	5.24**	0.03
Intergroup bias	0.66[a] (1.08)	0.55[a] (1.15)	0.55[a] (0.97)	0.88	0.00
Desire for outgroup friendship	3.50[a] (2.05)	4.02[b] (1.83)	3.98[b] (1.91)	5.68**	0.03

Note. Unless otherwise indicated, numbers are means, standard deviations are in parentheses. Means with different superscripts differ significantly from one another. Intergroup bias is a differential score, interpersonal closeness was measured with a five-point scale, all other scales were measured with seven-point scales.
** $p < 0.01$.
*** $p < 0.001$.

your parallel classes, how often do you perceive them…?" Participants responded on 7-point scales (1 = *never*, 7 = *always*) to the stems: (a) as people from a group that is different from your own? [intergroup level]; (b) as people with whom you share a common group membership? [superordinate group level]; and (c) as people from a different group that, at the same time, share a common group membership with you? [dual identity level].

2.4. Criterion variables

2.4.1. Interpersonal closeness

This measure assessed the perceived closeness of the self to an unnamed student from one of the parallel classes. The original Inclusion of Other in the Self (IOS) scale (Aron, Aron, & Smollan, 1992) was modified to consist of five pairs of overlapping circles of increasing degrees of overlap. Intergroup contact has previously been shown to predict interpersonal closeness (Eller & Abrams, 2003, 2004; Wright et al., 1997).

2.4.2. Desire for outgroup friendship

This measure builds on the Social Distance scale (Bogardus, 1933), which assesses what level of closeness or distance people desire with the target outgroup. The scale typically inquires about the desire to have an outgroup member as a neighbor, boss, co-worker, fellow student, best friend, and partner. Social distance has repeatedly been shown to be reduced by direct and indirect intergroup contact (Abrams et al., 2016; Eller & Abrams, 2003, 2004; Eller, Abrams, Viki, Imara, & Peerbux, 2007; Eller, Abrams, Viki, & Imara, 2007). In the current study we used the most relevant item of this scale, that of "best friend". The measure was scored on a 7-point scale (*not at all—very much*), with higher scores representing higher desire for friendship with outgroup members.

2.4.3. Intergroup anxiety

We measured intergroup anxiety (Stephan, Diaz-Loving, & Duran, 2000) by asking respondents to "show how you feel when interacting with students from your parallel classes: apprehensive, friendly, uncertain, comfortable, threatened, confident, awkward, safe, anxious, trusting." Items were scored on 7-point scales (*not at all—extremely*; five items were reverse scored), with higher scores indicating higher anxiety. The internal consistencies of the 9-item scale were satisfactory, with alphas = 0.80 at *T*1, 0.85, at *T*2, and 0.88 at *T*3, respectively.

2.4.4. Intergroup bias

We calculated this by subtracting general evaluation of the outgroup from general evaluation of the ingroup. The scale (Eller & Abrams, 2003, 2004; Wright et al., 1997) instructed participants to show how they felt about students from the parallel classes/students from their own class by using the following bipolar adjective pairs separated by a 7-point scale: *cold—warm*, *negative—positive*, *friendly—hostile*, *suspicious—trusting*, *respect—contempt*, *disgust—admiration* (pairs 3 and 5 were reversed). Responses were scored such that the more positive adjective received the higher score. General evaluation of outgroup αs = 0.79, 0.83, and 0.86; general evaluation of ingroup αs = 0.85, 0.88, and 0.90. The higher the intergroup bias score, the higher the bias towards the ingroup and against the outgroup.

3. Results

3.1. Panel attrition and comparison of participants

A MANOVA across the set of measures at *T*1 revealed significant differences between participants who later dropped out of the study and those who stayed in the sample throughout, Pillai's $V = 0.039$, multivariate $F(11, 615) = 2.28$, $p = 0.010$, partial $\eta^2 = 0.039$. Participants who stayed in the sample were significantly younger ($M = 16.64$, $SD = 0.62$) than those who dropped out ($M = 16.82$, $SD = 0.77$; $p = 0.002$), had significantly less qualitative contact (stayed in: $M = 4.55$, $SD = 1.20$, dropped out: $M = 4.78$, $SD = 1.20$; $p = 0.020$) and reported significantly less interpersonal closeness (stayed in: $M = 2.57$, $SD = 1.09$, dropped out: $M = 2.76$, $SD = 1.13$; $p = 0.039$). However, participants did not differ significantly with regards to gender, nationality, levels of categorization (intergroup, dual, superordinate), intergroup anxiety, intergroup bias, or desire for outgroup friendship (all $p > 0.148$).

Missing data are usually dealt with by deletion of missing participants, particularly in longitudinal datasets. However, listwise deletion procedures are based on the assumption of Missing Completely At Random (MCAR), which could result in seriously biased estimates with present levels of missingness (cf. Eller, Abrams, & Zimmermann, 2011). We used SPSS to calculate the fraction of missing data. This weights the proportion of missing information in the dataset by the number and quality of data imputations. We used 100 imputations to estimate the fractions missing, which amounted to 29.3%. The fraction of missing information is a diagnostic measure that informs the researcher how much power (more specifically, the squared standard errors) is impacted by the missing data. For example, an 8% fraction of missing information means that the squared standard error for a particular parameter would increase by 8% relative to the standard error from a complete data set. Multiple imputation, which is based on the assumption of Missing at Random (MAR), is superior to the method of participant deletion (Rubin, 1987). Data are MAR "if missingness is related to other measured variables in the analysis model, but not to the underlying values of the incomplete variable (i.e., the hypothetical values that would have resulted had the data been complete)" (Baraldi & Enders, 2010, p. 7). Given sufficient numbers of covariates to aid imputation (in the present research these included age, gender, and nationality), the assumption of MAR provides results that are less

Table 2
Correlations among variables at Time 1 (above the diagonal), Time 2 (below the diagonal), and Time 3 (lower part of table).

Measure	1	2	3	4	5	6	7	8
1. Quality of contact		–0.04	0.46***	0.38***	0.59***	–0.47***	–0.23***	0.47***
2. IG level of categorization	–0.13**		–0.05	0.05	–0.02	0.09*	0.04	0.04
3. SO level of categorization	0.55***	–0.07		0.60***	0.31***	–0.23***	–0.13**	0.30***
4. DI level of categorization	0.35***	0.18***	0.50***		0.21***	–0.19***	–0.10**	0.28***
5. Interpersonal closeness	0.49***	–0.01	0.23***	0.17***		–0.23***	–0.15***	0.42***
6. Intergroup anxiety	–0.52***	0.09	–0.31***	–0.11*	–0.23***		0.16***	–0.22***
7. Intergroup bias	–0.25***	0.10*	–0.12**	–0.05	–0.18***	0.09		–0.22***
8. Desire for outgroup friendship	0.55***	–0.06	0.31***	0.23***	0.37***	–0.22***	–0.27***	
1. Quality of contact	–							
2. IG level of categorization	–0.10*	–						
3. SO level of categorization	0.51***	–0.02	–					
4. DI level of categorization	0.28***	0.27***	0.41***	–				
5. Interpersonal closeness	0.46***	–0.12*	0.38***	0.18***	–			
6. Intergroup anxiety	–0.47***	0.12*	–0.27***	–0.05	–0.21***	–		
7. Intergroup bias	–0.22***	0.11*	–0.12**	0.02	–0.21***	0.10*	–	
8. Desire for outgroup friendship 0.46***		–0.09	0.43***	0.19***	0.42***	–0.04	–0.14**	–

Note. Numbers are correlation coefficients (*r*). Interpersonal closeness was measured with a five-point scale, all other measures with seven-point scales. IG = Intergroup, SO = Superordinate, DI = Dual Identity.
*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$. Correlations are based on pooled multiple imputed data with $N = 814$.

biased than listwise deletion (Graham, 2003). Thus we were able to treat missing data as MAR and to impute the missing data using all variables present in the dataset.

For each imputation, a copy of the dataset is created containing unique imputed values. The multiple sets of parameter estimates and standard errors across imputed data sets are subsequently combined into a single set of pooled results (Baraldi & Enders, 2010). Given the relatively high level of missingness across the measures and waves, we conservatively imputed our dataset 100 times, using SPSS (see Graham, Olchowski, & Gilreath, 2007).

3.2. Mean changes over time

A repeated-measures MANOVA revealed that scores on the measures changed significantly over time, Pillai's $V = 0.26$, multivariate $F(16, 816) = 7.63$, $p < 0.001$, partial $\eta^2 = 0.29$. Table 1 shows that there were significant univariate effects of time for five out of eight variables. Compared with *T*1, quality of contact, interpersonal closeness, and desire for outgroup friendship increased while intergroup anxiety decreased at *T*2 and did not change between *T*2 and *T*3. The dual identity level of categorization was significantly lower at *T*3 than at *T*1 (*T*2 was mid-way between the two but did not differ significantly from either).

3.3. Correlations among variables

Table 2 shows correlations among variables within each time point of the study. Within all three time points, consistent with contact theory, quality of contact correlates significantly with the criterion variables: Higher-quality contact is associated with greater interpersonal closeness and desire for outgroup friendship, and with lower intergroup anxiety and bias. Both superordinate and dual identity levels are positively related to contact, whereas intergroup categorization is negatively related to contact (though less strongly, and non-significantly at *T*1). Finally, within all three time points all three levels of categorization are significantly related to the criterion variables. Thus, the correlational relationships are both theoretically consistent and sufficiently robust that the data set provides a very good basis for testing longitudinal effects. Moreover, none of the correlations is above 0.6, which suggests that multi-collinearity does not present a problem in the regression analyses.

3.4. Longitudinal analyses

Due to the nested nature of the data (i.e., students within classes within schools), we first conducted multilevel analyses in order to determine whether any higher-level variance needed to be accounted for. If significant amounts of variance on the class and/or school level exist independence of data cannot be assumed, and an inflation of the alpha error may result (e.g., Krull & MacKinnon, 2001). As Table 3 shows, none of the variables showed significant amounts of variance at the class or school level, respectively. For subsequent analyses we therefore used standard hierarchical regression analysis as is conventional in such cases.[1]

[1] Some students could not be matched with their classes leading to missing values on the class- and school-levels. As a result, our multilevel models are based on a slightly smaller sample than our hierarchical multiple regression analyses. For this reason, we also chose to use hierarchical multiple regression analyses instead of multilevel modelling where higher-level variance was non-significant.

Table 3
Proportion of variance at the individual, class and school level for outcome variables at T2 and T3.

Outcome Variable	*T2*			*T3*		
	Individual	Class	School	Individual	Class	School
Interpersonal closeness	0.988	0.009	0.003	0.993	0.005	0.002
Intergroup anxiety	0.997	0.002	0.001	0.993	0.007	0.000
Intergroup bias	0.992	0.005	0.003	0.993	0.007	0.000
Desire for outgroup friendship	0.993	0.007	0.000	0.986	0.010	0.004

friendship significantly, either from *T*1 to *T*2 (closeness: β = 0.11, $p = 0.094$, friendship: β = 0.04, $p = 0.517$) or from *T*2 to *T*3 (closeness: β = 0.11, $p = 0.094$, friendship: β = 0.11, $p = 0.148$).

We also conducted reverse analyses in order to test the directionality of the effect. None of the outcome variables had a significant effect on intergroup contact from *T*1 to *T*2 or from *T*2 to *T*3, with all $\beta < 0.07$, all $p > 0.200$.

3.6. Congruence hypothesis: longitudinal effects of levels of categorization

The congruence hypothesis predicts that the level of categorization that matches the social structure of the intergroup contact situation most closely should be more strongly related to the outcome variables than levels of categorization that match the social structure less closely.

Table 4
Main and interactive effects of quality of contact and levels of categorization on outcome variables.

DVs	Contact	IG level	SO level	DI level	Contact × IG	Contact × SO	Contact × DI
*T*1 – *T*2							
IP closeness	0.11 (1.68)	0.04 (0.91)	0.01 (0.09)	− 0.06 (− 0.97)	− 0.001 (− 0.02)	0.03 (0.60)	− 0.03 (− 0.65)
Intergroup anxiety	0.03 (0.55)	− 0.13* (− 2.54)	− 0.05 (− 0.87)	− 0.004 (− 0.07)	− 0.02 (− 0.49)	− 0.01 (− 0.14)	0.01 (0.11)
Intergroup bias	− 0.06 (− 1.06)	− 0.04 (− 0.96)	− 0.04 (− 0.61)	0.01 (0.19)	− 0.02 (− 0.51)	0.02 (0.33)	− 0.03 (− 0.61)
Desire for outgroup friendship	0.04 (0.65)	0.15*** (3.24)	0.05 (0.79)	− 0.002 (− 0.03)	0.05 (1.22)	0.001 (0.02)	− 0.02 (− 0.45)
*T*2 – *T*3							
IP closeness	0.11 (1.68)	− 0.01 (− 0.22)	− 0.18* (− 2.57)	0.11 (1.68)	− 0.05 (− 1.11)	− 0.05 (− 1.10)	0.06 (1.23)
Intergroup anxiety	− 0.20** (− 2.98)	0.03 (0.48)	0.14 (1.91)	− 0.09 (− 1.33)	− 0.01 (− 0.22)	0.01 (0.30)	0.02 (0.33)
Intergroup bias	− 0.14* (− 2.24)	− 0.004 (− 0.06)	0.16* (2.29)	− 0.15* (− 2.55)	0.04 (1.02)	− 0.03 (− 0.61)	0.03 (0.62)
Desire for outgroup friendship	0.11 (1.45)	0.01 (0.17)	− 0.09 (− 1.12)	− 0.06 (− 0.94)	− 0.01 (− 0.28)	− 0.03 (− 0.56)	0.04 (0.80)

Note. Numbers are betas (β), ts in parentheses. Control variables: auto-regressor, age, gender, nationality; IG = intergroup, SO = superordinate, DI = dual identity, IP = interpersonal.
* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

Using multiple imputed data, we entered the auto-regressor (i.e., the outcome variable at *T*1) in Step 1, our control variables age, gender (male/female) and nationality (German/non-German) in Step 2, the main effects of quality of contact *T*1 and levels of categorization *T*1 (intergroup, dual identity and superordinate, respectively) in Step 3, and the three quality of contact × levels of categorization interactions in Step 4, in order to predict dependent variables at *T*2. The same was done for *T*2 to *T*3 analyses.[2]

3.5. Consolidation hypothesis: Longitudinal effects of intergroup contact

Based on the consolidation hypothesis, we expected the effect of intergroup contact to be stronger in Phase 2 (*T*2/*T*3) than in Phase 1 (*T*1/*T*2). In line with our hypothesis, Table 4 shows that the negative effect of intergroup contact on intergroup anxiety was stronger from *T*2 to *T*3 ($\beta = -0.20$, $p = 0.003$) than from *T*1 to *T*2 (β = 0.03, $p = 0.586$; difference between betas: $p = 0.011$). A similar pattern was found for intergroup bias: the negative effect of intergroup contact was non-significant from *T*1 to *T*2 ($\beta = -0.06$, $p = 0.291$) but became significant from *T*2 to *T*3 ($\beta = -0.14$, $p = 0.026$), although the effects did not differ significantly from each other ($p = 0.372$). Intergroup contact did not affect interpersonal closeness or the desire for outgroup

At *T*1, parallel classes were structurally segregated. We therefore predicted that categorization at the intergroup level would predict outcomes from *T*1 to *T*2 but not from *T*2 to *T*3. As Table 4 shows, categorization at the intergroup level was related to reduced intergroup anxiety from *T*1 to *T*2 ($\beta = -0.13$, $p = 0.010$) but not from *T*2 to *T*3 (β = 0.03, $p = 0.634$; difference between betas: $p = 0.038$). Similarly, intergroup categorization was associated with increased desire for outgroup friendship from *T*1 to *T*2 (β = 0.15, $p = 0.001$) but not from *T*2 to *T*3 (β = 0.01, $p = 0.596$; difference between betas: $p = 0.048$). However, intergroup categorization did not affect changes in interpersonal closeness or intergroup bias significantly from *T*1 to *T*2 (closeness: β = 0.04, $p = 0.363$, bias: $\beta = -0.04$, $p = 0.339$) or from *T*2 to *T*3 (closeness: $\beta = -0.01$, $p = 0.827$, bias: $\beta = -0.004$, $p = 0.949$).

At *T*2 and *T*3, parallel classes were structurally integrated. Hence, we expected categorization at the superordinate level and categorization at the dual identity level to predict outcomes from *T*2 to *T*3 but not from *T*1 to *T*2. Still consistent with the congruence hypothesis, but in an unexpected direction, superordinate identity categorization affected outcome variables from *T*2 to *T*3 more strongly than from *T*1 to *T*2. More specifically, categorization at the superordinate level was significantly associated with reduced (rather than increased) interpersonal closeness from *T*2 to *T*3 ($\beta = -0.18$, $p = 0.011$) but not from *T*1 to *T*2 (β = 0.01, $p = 0.922$; difference between betas: $p = 0.036$) and it was significantly related to increased intergroup bias from *T*2 to *T*3 (β = 0.16, $p = 0.023$) but not from *T*1 to *T*2 ($\beta = -0.04$, $p = 0.540$; difference between betas: $p = 0.037$). Superordinate categorization was also marginally significantly related to heightened intergroup anxiety from *T*2 to *T*3 (β = 0.14, $p = 0.058$) but not from *T*1 to *T*2 ($\beta = -0.05$, $p = 0.386$; difference between betas: $p = 0.030$). However, it did not affect the desire for outgroup friendships signifi-

[2] *Higher-level variance at T2.* The intercept-only model for *T*2 criterion variables revealed no significant class-level variance for any measure, and significant school-level variance only for interpersonal closeness ($\tau_{00} = 0.03$, $\chi^2(8) = 18.89$, $p = 0.015$). These results show that there were commonalities within schools in their responses to the interpersonal closeness measure. In subsequent analyses variation due to school is accounted for prior to evaluating level 1 variance (differences between individuals).
Higher-level variance at T3. The intercept-only multilevel model indicated no significant school-level variance for any measure and significant class-level variance only on desire for outgroup friendship ($\tau_{00} = 0.20$, $\chi^2(24) = 52.92$, $p = 0.001$). In subsequent analyses variation due to class is accounted for prior to evaluating level 1 variance (differences between individuals).

cantly, either from *T*1 to *T*2 (β = 0.05, *p* = 0.429), or from *T*2 to *T*3 (β = −0.09, *p* = 0.263).[3]

Consistent with the congruence hypothesis, categorization at the dual identity level was significantly related to reduced intergroup bias from *T*2 to *T*3 (β = −0.15, *p* = 0.011) but not from *T*1 to *T*2 (β = 0.01, *p* = 0.854; difference between betas: *p* = 0.082). The effect of a dual identity categorization on interpersonal closeness also differed between the two phases (*p* = 0.040), increasing from a non-significant, negative effect from *T*1 to *T*2 (β = −0.06, *p* = 0.333) to a marginally significant, positive effect from *T*2 to *T*3 (β = 0.11, *p* = 0.094). However, dual identity categorization had no significant effects on intergroup anxiety or desire for outgroup friendship, either from *T*1 to *T*2 (anxiety: β = −0.004, *p* = 0.942, friendship: β = −0.002, *p* = 0.976) or from *T*2 to *T*3 (anxiety: β = −0.09, *p* = 0.187, friendship: β = −0.06, *p* = 0.347).

No significant interactions between contact quality and levels of categorization were found in the dataset with multiple imputed data (but there were some significant interactions using the lower *N*s and with casewise deletion – see Supplementary material for details).

We also conducted reverse analyses to test the directionality of the effect between categorization levels and outcome variables. Intergroup anxiety at *T*1 was significantly associated with reduced categorization at the superordinate level at *T*2 (β = −0.11, *p* = 0.035). However, no other significant effects from outcome variables to levels of categorization were found, either from *T*1 to *T*2 or from *T*2 to *T*3, with all β < 0.09, all *p* > 0.190.

4. Discussion

This research adds substantially to the scarce longitudinal research conducted on levels of categorization during contact (Brown et al., 2007; Eller & Abrams, 2004; Greenland & Brown, 1999). Compared with most previous longitudinal studies, the present research involved a much larger number of participants, more waves of data, and was conducted over a more extended time frame. Uniquely, this is the only study to have examined longitudinal contact effects when there is an institutionally supported change in intergroup structure within an otherwise stable context. Thus, we were able to test predictions about when and how a structural change affects the way contact and subjective categorization relate to intergroup relations. Overall, our predictions regarding main effects of contact and levels of categorisation on outcome variables were supported. However, we found no interaction effects between contact quality and levels of categorisation on outcomes.

Our first hypothesis was the basic tenet of intergroup contact theory, that higher quality of contact should predict more positive intergroup relations over time. This *consolidation hypothesis* was clearly supported. The structural change between the two phases did result in significant reductions in intergroup anxiety and intergroup bias in Phase 2, attesting to the overall effects of institutional support, similarity and equal-status contact, as specified by Allport's original theory. In the context of these overall changes, given the structural facilitation from *T*2 onwards, we expected more pronounced effects of participants' actual contact during the second, compared to the first phase of the study. Consistent with this idea, significant effects of contact only emerged in Phase 2, and the effects of contact were larger between *T*2 and *T*3 than between *T*1 and *T*2. Indeed, during the institutionally sanctioned transition from segregation to integration (*T*1–2), quality of contact in and of itself predicted none of the outcome variables. However, following this transition, between *T*2 and *T*3, higher-quality contact was associated with reductions in intergroup anxiety as well as bias. It is interesting to note that contact related to intergroup anxiety and bias, which are more "intergroup" variables, and not to friendship or closeness, which are more "interpersonal" variables. This might be due to the fact that the objective structure was characterized by an emphasis on the group (or formerly, different groups) rather than interpersonal relationships.

Our second hypothesis was that the association between different levels of categorization and intergroup relations would depend on the prevailing intergroup structure. Specifically, we proposed a *congruence hypothesis*. During Phase 1, we expected that subjectively perceived intergroup categorization would be most likely to be related to positive intergroup relations, because prior to and during this phase the categorization into different classes was objectively manifested and institutionally sanctioned. Recognizing these differences should enable participants to form positive views of the outgroup as a coherent entity. In Phase 2, when there was institutional support for a desegregated structure, we expected that recognition of superordinate and dual identity categorization would be influential because there now existed an objective reality that mapped onto the superordinate level, a common ingroup.

Several pieces of evidence were consistent with the congruence hypothesis. From *T*1 to *T*2 only the intergroup level of categorization had significant effects. In line with our predictions and with Hewstone and Brown's (1986) ideas, participants who initially held a stronger intergroup categorization ultimately expressed a greater desire for outgroup friendships, and less intergroup anxiety. It is interesting that, in contrast to these positive longitudinal effects, the intergroup level had negative effects *cross-sectionally*. For example, the intergroup level was significantly associated with higher intergroup bias or anxiety at all time points (see Table 2). One possible explanation is that when group structure is in transition there is a greater positive change in intergroup bias when the starting categorization is at the intergroup level, such that within any time point higher intergroup categorization is associated with higher bias and anxiety but across time points, as the intergroup structure changes, it is those participants who started with the strongest intergroup categorization who change the most. This pattern is exactly reversed for the superordinate level of categorization and serves as a reminder that cross-sectional evidence is often discrepant in relation to longitudinal evidence (e.g., Eller & Abrams, 2004, Table 5; Gleibs et al., 2010), underscoring the need for longitudinal research in the area of intergroup contact, in order to avoid over-emphasis on particular causal paths and under-consideration of others (Pettigrew, 1998).

From *T*2 to *T*3 there emerged significant effects of both the superordinate and dual identity levels. Consistent with the congruence hypothesis, over time, the dual identity level was related to decreased intergroup bias as well as, marginally, to increased interpersonal closeness. The longitudinal design of the present research revealed that, from *T*2 to *T*3, the superordinate level had consistently bias-*augmenting* effects on interpersonal closeness, intergroup anxiety (marginally) and bias. In contrast, the within-time correlations in Table 2 show that a subjectively perceived superordinate categorization is associated with less bias, a pattern that seems consistent with CIIM. Why might this be? A possibility, as mentioned in the Introduction, is that members of different groups can sometimes perceive the merging of ingroup and outgroup as threatening (Abrams & Eller, 2017; Terry & O'Brien, 2001; Wohl et al., 2012). Given that students in the present study identified quite strongly with their respective classes,

[3] Given the negative results of the superordinate level of categorization from *T*2 to *T*3, we repeated these longitudinal analyses but included identification with (former) school class as a moderator. This was done to examine whether identification interacted with the superordinate level to predict intergroup bias. Identification was measured with a four-item scale (e.g., "I still feel strong ties to my former class") and Cronbach's alpha scores were 0.81 and 0.78 at *T*2 and *T*3, respectively. In the regression analyses we entered main scores of contact, levels of categorization, and identification at Step 1, the two-way interactions of contact × levels of categorization, contact × identity, and levels of categorization × identity at Step 2, and the three-way interactions of contact × identity × levels of categorization at Step 3. There were no significant identification × superordinate level interaction effects on any of the four outcome variables, such that (high) identification with former school class cannot explain the negative main effects of the superordinate level of categorization.

recognizing the dissolution of these identities might be quite unsettling, leading to uncertainty and anxiety. Also, when there ceases to be a clearly defined "them" it is equally blurred who "we" are. Thus, an impending superordinate categorization might create a sense of loss and resentment towards the outgroup that leads to higher rather than lower intergroup bias over time (González & Brown, 2003; Hornsey & Hogg, 2000a, 2000b). Applied to the current study, it seems plausible that students identify not only with the newly formed *Jahrgangsstufe* (grade), but also continue identifying with their former class, at least at the beginning of the merger (*T*2). Considering this, it is understandable why the dual identity level was somewhat more successful in the present context, at least with regard to a reduction in intergroup bias and an increase in interpersonal closeness.

Finally, contrary to our tentative hypotheses regarding interactive effects of contact and categorization over time, the multiply imputed data revealed no such effects, though we note some did emerge when we analyzed data with casewise deletion (see Supplementary material). Therefore, we cannot rule these hypotheses out completely - they seem worthy of investigation in future research.

Finally, we found only one piece of evidence for reversed causality. *T*1 intergroup anxiety was associated with reduced superordinate categorization at *T*2. Therefore, it seems to be the case (a) that, generally, contact improved intergroup attitudes and not the reverse (see Eller & Abrams, 2004), and (b) that, on the whole, the levels of categorization affected intergroup bias and not the reverse (cf. Hong et al., 2006, who also found evidence for both directions). Overall then, we discovered clear evidence for the consolidation hypothesis that the positive effect of high-quality contact strengthens once the context becomes supportive. We also demonstrated tentative evidence in support of the congruence hypothesis, that levels of categorization are most likely to reduce prejudice and play a greater role in prejudice change when they map onto the imminent institutionally-sanctioned social structure.

5. Implications

Longitudinal data are still comparatively rare in the intergroup contact literature as a whole and the contact research involving categorization, in particular. Thus, the present research provides valuable real-world tests of the long-term effects of contact and levels of categorization, and tests of the potential causal relationships among variables. Most importantly we were able to examine the effects of contact and subjectively perceived levels of categorization on reduction of intergroup bias and improvement of intergroup relations across a period of structural change.

The findings associated with the intergroup level of categorization are particularly noteworthy because they show clearly distinctive effects emerging in different structural contexts. It is not the case that the intergroup level uniformly predicted better or worse intergroup outcomes, as suggested by some previous research (e.g., Brown et al., 2007, vs. Stone & Crisp, 2007). Instead, we found that the intergroup level had solely bias-reducing effects when classes were segregated, but had no significant effects when classes were integrated. In contrast, the superordinate level had no effects when groups were segregated and negative effects when groups were integrated. Finally, and perhaps most encouragingly, a dual identity had positive effects when groups were integrated.

These findings provide a clear demonstration that both temporal and structural factors of the intergroup context need to be taken into account when deciding to emphasize a particular level of categorization as the most effective route for improving intergroup relations (Abrams & Eller, 2017). During Phase 1 of our study, when groups were objectively and justifiably categorized, the subjectively perceived intergroup level was most effective at decreasing prejudice. Importantly, despite apparently positive within-time correlations, we showed that once groups were structurally integrated, the longer term effect of subjectively perceived superordinate categorization was negative rather than positive.

An important question for future research is whether, in the much longer term (e.g., after several years of structural integration), the roles of the superordinate level and dual identity might alter so that superordinate identity once again promotes positive intergroup relations, and dual identity might become less effective. It is conceivable that if structural segregation is introduced early on (e.g., educational segregation by religion, ability, or ethnicity) either by accident or by selection processes, the intergroup level of categorization might persist and be highly accessible in the future, even when individuals move to a desegregated context. In the UK, for example, university students who come from the private and state school systems may tend to gravitate towards others who shared their own school system even though the university context is fully integrated (cf. Brown et al., 2007). In terms of practical contributions, then, our research can speak to the issue of improving intergroup relations in an educational context and ultimately, ameliorating the educational climate.

We cannot draw exact parallels between our research and ethnic and religious socio-political structures, particularly those that are characterized by intergroup conflict (cf. Abrams & Eller, 2017). However, evidence from history (e.g., in former Yugoslavia) does suggest that historical structural intergroup fault lines that define different social identities can persist (Liu & Hilton, 2005) and that imposition of a superordinate level may even backfire if it involves suppressing rather strong and important intergroup levels rather than allowing dual identity (Gomez, Dovidio, Huici, Gaertner, & Cuadrado, 2008).

6. Limitations

We are aware that this research has limitations. A caveat for both our hypotheses and findings is that they address a situation, which is characterized by a certain level of competitive intergroup comparison and bias but not violent or intractable conflict. Such situations are quite common and the present study therefore makes an important and relevant contribution. For example, the study maps on to situations when organisations, such as the police or military, actively recruit minority members and emphasize that individuals from all backgrounds are now part of the same team, or when a school or sports club moves from gender (or other types of) segregation to becoming fully mixed, or when culturally different organisations with similar goals merge. However, the present study does not speak directly to conflict-ridden settings studied in some intergroup contact research, such as majority-minority contact in the US or Catholic-Protestant contact in Northern Ireland. Also, the study does not allow us to infer whether the contact and categorization effects would remain consistent with the consolidation and congruence hypotheses during unexpectedly imposed transitions from divided groups to a common group (as in takeovers or sudden mergers between organizational competitors, or forced integration of ethnic groups under a dictatorship). These remain important questions for future research (also see Abrams & Eller, 2017).

Moreover, it would have been ideal to have two data collection time points not only for the integration phase but also the segregation phase. This would have allowed a more complete test of the consolidation and congruence hypotheses. Unfortunately, practical constraints made this unfeasible. Levels of categorization as well as two of our four outcome variables were assessed with single-item measures based on scales available in the literature. Future research should consider developing reliable multi-item scales for use in longitudinal studies. Nonetheless, our data show an internally consistent and meaningful pattern of findings. Across all measures, including bias and friendship measures, the significant correlations within each time are consistent with the assumptions of intergroup contact theory. We are aware that, given our relatively large sample size, many correlations reach significance even though effects might be comparatively small. Yet the longitudinal analysis shows that whereas evidence from simple bivariate correla-

tions does illuminate the contemporaneous links between processes, it does not necessarily capture how they work dynamically over time (Abrams & Eller, 2017).

The investment in complex and time-consuming longitudinal studies is particularly worthwhile for the area of intergroup contact and cross-group friendships because time is required for relationships to become meaningful or close and important to the actors and hence to exert influence on other variables, such as prejudice or behavior. These features are impossible to simulate in a cross-sectional methodology. The present research, which represents a substantial source of evidence, provides strong external and ecological validity and, reassuringly, has provided support that is consistent with our predictions derived from social psychological theory and research.

7. Conclusions

The present longitudinal findings, deriving from an initial sample of over 700 people all involved in the same intergroup structure, show that although the positive effects of intergroup contact may generally increase and be consolidated over time, the structure of the intergroup context and subjectively perceived levels of categorization moderate the relationship between contact and intergroup bias. When the setting is clearly segregated and institutionally legitimized, it seems that whether people apply an intergroup level of categorization has most influence, positively affecting intergroup relations. When the context becomes institutionally integrated, people's application of a dual identity categorization has positive impact. Regardless of contact, superordinate categorization appears to hold potential risks and may potentially inhibit positive intergroup attitudes, perhaps by diluting the effect of dual identity.

Our findings suggest further fascinating questions for new research. For example, in situations where there is clearly unjustifiable structural segregation, or alternatively, forced integration, one might expect efforts to promote particular levels of categorization to produce reactive effects rather than improving intergroup relations. This suggests that variables, such as, perceived legitimacy, status, system justification, and social dominance might well play important moderating roles between social structure and intergroup contact on the one hand, and categorization and intergroup bias on the other.

Finally, it is important not to lose sight of a key finding of broader impact. It appears that the potential for contact to influence intergroup relations is greatest if the legitimized social structure is one of integration rather than segregation. This highlights the crucial importance of legislative and normative frameworks in creating the potential for social psychological processes to operate effectively, but our evidence also shows that the impact is likely to be enhanced if reinforced by matching psychological processes (in this case, dual identity) at the relevant transitional points. In educational settings, if we are to reduce prejudice and social exclusion and enhance the educational climate, social psychologists increasingly need to find ways to engage with politicians and policy makers to incorporate psychological interventions that mesh effectively with changing intergroup structures (Abrams & Christian, 2007).

Appendix A. Supplementary data

Supplementary data to this article can be found online at http://dx.doi.org/10.1016/j.jesp.2017.04.005.

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