



Liking and disliking minority-group classmates: Explaining the mixed findings for the influence of ethnic classroom composition on interethnic attitudes

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ABSTRACT

Research on the influence of the number of ethnic minority group classmates on majority group students' interethnic attitudes produced conflicting results. With data from 728 early adolescents, we found that the effect of the ethnic class composition depends on two opposing student-level mechanisms. First, majority group students who liked a larger number of minority group classmates developed more positive attitudes toward minority groups. Second, students who disliked a larger number of outgroup classmates developed more negative outgroup attitudes. In our sample, these two effects neutralized each other because the sample consisted of about the same number of students that liked most of their outgroup classmates and students that disliked most outgroup classmates. Results were consistent in cross-sectional and longitudinal analyses. These results support a new interpretation of the mixed findings in past research, suggesting that past studies may have differed in the number of students who liked and disliked outgroup classmates.

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1. Introduction

Building on Allport's (1954) contact hypothesis, numerous studies predicted that mixing students of different ethnicities in schools would improve students' attitudes toward other ethnic groups (e.g., Bakker et al., 2007; Ellison and Powers, 1994; Moody, 2001; Vervoort et al., 2011). Yet, empirical tests of this prediction have produced mixed results (Thijs and Verkuyten, 2014). Some studies have found that the number of members of other ethnic groups a student encountered at school predicted positive attitudes of the student toward these groups during childhood, and also later in life (Ellison and Powers, 1994; Patchen, 1982; Van Geel and Vedder, 2011; Wagner et al., 2003; Wood and Sonleitner, 1996). However, others provided no support for a relationship between school or classroom composition and outgroup attitudes (Bakker et al., 2007; Wagner et al., 1989). Furthermore, recent research even found a negative relationship between the number of outgroup classmates and students' attitudes toward the ethnic groups of these classmates (Vervoort et al., 2011).

We propose that earlier research produced these mixed findings because it was often assumed that having outgroup classmates automatically results in positive intergroup contact. However, interaction with outgroup members can also be

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perceived as unpleasant (Pettigrew and Tropp, 2006), which leads to negative rather than positive outgroup attitudes (Barlow et al., 2012; Pettigrew et al., 2011).

To improve, the present study focuses on the effect of liking and disliking of individual outgroup classmates on attitudes toward the outgroup as a whole. We build on research on stereotype change, which has shown that people adjust their attitudes toward an outgroup to what they think about individual members of that group (Columb and Plant, 2011; Garcia-Marques and Mackie, 1999; Kunda and Oleson, 1997). Instead of measuring positive and negative contact experiences, this approach acknowledges that students in mixed school classes may not interact frequently and may, thus, often not be able to report actual contact (Turner et al., 2007). This is particularly problematic for negative contact experiences, because students may avoid actual interaction with negatively perceived others and thus not report negative contact. However, even without such interactions, students may still like or dislike their outgroup classmates (Dijkstra et al., 2010, 2007), which has been shown to be generalized toward their attitudes toward the outgroup as a whole (Stark et al., 2013).

The notion that interpersonal liking and disliking relationships are generalized to outgroup attitudes offers a new interpretation of the mixed findings of previous research on the effects of classroom composition. Studies that found a positive effect of ethnic classroom composition on outgroup attitudes may have focused on settings with more liking than disliking relationships between members of different groups. Those studies that did not find an effect may have investigated settings where the effects of liking and disliking relationships cancelled each other out. And in the study that reported more negative attitudes in mixed classes, students may have mostly disliked their classmates from other ethnic groups.

We contrast our new predictions in particular against a hypothesis derived from group-threat theory (Quillian, 1995), which has been tested most often in search for explanations for negative effects of classroom composition on interethnic relations (e.g., Moody, 2001; Vervoort et al., 2011). Other explanations of the mixed findings that have been offered include varying behavior of the teachers, multicultural curriculums but also differences between studies in terms of the respondents' age, differences in the dependent variables used, and the influence of omitted variables (Bekhuis et al., 2013; Thijs and Verkuyten, 2014). The present study cannot test all these explanations but it is unlikely that any of these processes could be confounded with the new student-level mechanisms we are proposing.

We study the attitudes of 728 native Dutch students in the Netherlands toward the ethnic minority groups of Turkish and Moroccan people. Hypotheses are tested both cross-sectionally and longitudinally to minimize the problem of wrong conclusions due to a potential reversed causal effect of students' outgroup attitudes on their liking or disliking of outgroup classmates.

1.1. *Liking and disliking classmates instead of contact*

Earlier studies on the effect of classroom composition on outgroup attitudes may have produced mixed findings because the amount of interethnic contact was conceptualized as the number of outgroup classmates the students had (e.g., Bakker et al., 2007; Ellison and Powers, 1994; Vervoort et al., 2011). We argue that equating exposure to outgroup members in the classroom with intergroup contact may be misleading because the positive effect of intergroup contact on prejudice reduction is mainly mediated by affective mechanisms that develop in *positive* relationships (Pettigrew et al., 2011; Swart et al., 2011), such as intergroup friendships (Davies et al., 2011). If students do not form such positive relationships but experience the contact as being negative, exposure to outgroup classmates can have the opposite effect and increase negative attitudes (Bekhuis et al., 2013).

Instead of assuming that exposure to outgroup classmates represents intergroup contact, we study whether students like or dislike each of their individual classmates. Conceptualizing interpersonal attitudes between classmates in terms of liking and disliking goes beyond research on intergroup contact with its focus on actual interactions such as in friendships (Davies et al., 2011) or violent encounters (Schmid et al., 2008). Our approach acknowledges that individuals can form positive or negative attitudes toward strangers without actual interaction, simply on basis of their looks and behavior (Havekes et al., 2013). In school classes, for instance, it has been shown that observing a classmate bullying someone else creates disliking of the bully (Dijkstra et al., 2007). Moreover, physically fit or attractive students are more liked by their classmates and, consequently, less fit or attractive students are less liked (Dijkstra et al., 2010).

We propose that positive and negative interpersonal evaluations of classmates affect intergroup attitudes in the same fashion as positive and negative contact experiences. This notion builds on a long tradition of research on stereotype change, which has shown that people generalize from what they think about individual members of outgroups toward their attitudes toward the outgroup as a whole (Johnston and Hewstone, 1992; Kunda and Oleson, 1997; Paolini et al., 2009). This process can reduce negative attitudes toward other groups if the opinion about the individual outgroup member is positive (Garcia-Marques and Mackie, 1999). For instance, a number of studies found that exposure to Barack Obama at the time of the 2008 U.S. presidential election reduced anti-Black prejudice (Bernstein et al., 2010; Columb and Plant, 2011; Plant et al., 2009). However, attitude generalization can also result in more negative outgroup attitudes if the opinion about individual group members is negative (Dolderer et al., 2009). In fact, recent research has shown that students in school classes generalize positive and negative attitudes they have toward classmates from other ethnic groups to the same extent (Stark et al., 2013).

The process of generalizing positive and negative interpersonal attitudes may offer a new explanation of the conflicting findings on the effect of ethnic class composition on students' interethnic attitudes. If in a school class students like more of

their outgroup classmates than they dislike, attitude generalization should lead to more positive average outgroup attitudes. However, if a classroom comprises mainly disliking relationships with outgroup classmates, attitude generalization implies that the observed average level of negative outgroup attitudes will increase. Finally, if the numbers of liking and disliking relationships in a school class are the same, outgroup attitudes may not change at all on average. Some students develop more positive outgroup attitudes and others develop more negative attitudes, but these effects may neutralize each other in the aggregate.

1.2. An explanation based on group threat

Previous research often explained negative effects of ethnic mixing in schools on interethnic relations and attitudes with group-threat theory (Moody, 2001; Vervoort et al., 2011). According to this theory, higher numbers of minority group members in a given setting may be perceived as a threat to the majority's economic position (Quillian, 1995) or its cultural dominance (McLaren, 2003). If majority members feel that the minority group has grown too big, then they might fear to lose their status as the dominant group in the classroom. In particular, they may be put off by conflicting values or lifestyles that become more salient with a larger minority group. In contrast to contact theory, group-threat theory does not rely on members of different groups having actual contact. Merely perceiving the outgroup to grow in size is sufficient to induce feelings of threat. Thus, larger number of outgroup classmates could be associated with more negative attitudes toward that group.

If a combination of the positive exposure effect and the negative group-threat effect is at play (Schlueter and Scheepers, 2010), the size of the minority group should be associated with outgroup attitudes in a non-linear fashion (Havekes et al., 2011). Low numbers of outgroup classmates may be associated with positive attitudes but once the number of outgroup members reaches a certain level threat occurs, which leads to more negative attitudes toward the outgroup. In line with this argument, Vervoort et al. (2011) found that majority group students held more negative attitudes toward the minority group only in classes that consisted of more than 50% minority group members. Class composition had no effect on outgroup attitudes below this threshold. Thus, we also tested for a potentially non-linear group-threat effect as an alternative explanation for mixed effects of the ethnic class composition.

1.3. The present study

Our study investigated a new potential explanation for the mixed results of empirical research on the effects of classroom composition on interethnic attitudes. We tested whether the effect of ethnic class composition on outgroup attitudes can be explained by the student-level process of attitude generalization. That is, we tested whether the *quantity* of liked and disliked minority group classmates majority students had could explain whether or not outgroup attitudes among these majority group students improved.

Our analyses proceeded in three steps. First, we examined with data from the Netherlands whether the number of classmates from the Turkish or Moroccan minority groups was associated with more positive (exposure effect) or more negative (group-threat effect) attitudes of Dutch majority group students toward these outgroups as a whole. Because the scales for attitudes toward Turkish and Moroccan people loaded on the same underlying factor, they were combined into one dependent variable.

In the second step, we explored the potential combination of an exposure and a group-threat effect and tested for a non-linear effect of the number of outgroup classmates. This would indicate that larger numbers of minority group classmates are more strongly associated with negative outgroup attitudes than are smaller numbers. In the third step, the effects were separated out for the number of liked minority group classmates, the number of classmates that are evaluated neutrally, and the number of disliked classmates. The central question was whether these separate student-level effects could explain the effect of ethnic classroom composition that was found in the first step. The analyses were carried out with cross-sectional data to match the approach used in almost all previous studies on ethnic classroom composition. Yet, the analyses were also replicated in a longitudinal design to test for a lagged effect of interpersonal liking and disliking on the change of outgroup attitudes, which would be in line with a causal effect from interpersonal attitudes on attitudes.

2. Material and methods

2.1. Sample

Data were drawn from the secondary-school module of The Arnhem School Study (TASS), a longitudinal study of students' social networks and interethnic attitudes in their first years of secondary education, when students were aged 12–13 (Stark and Flache, 2012). Sixty-one (88.4%) of all first-year classes in the 12 secondary schools in the city of Arnhem, a mid-sized city in the Netherlands, took part in the study. Data for the current study stem from Wave 1 (called T0 here), which was conducted after students had been together in their new classes for two or three weeks (September 2008). Wave 2 (T1) was conducted three months later (December 2008), and Wave 3 (T2) was collected six months later (June 2009). The central outcome variable was students' outgroup attitudes at T2, after they had been exposed to their classmates for at least one school year.

There were 1366 students in all school classes at T2, of which 1197 (87.6%) participated in the data collection. However, six classes had to be excluded from the current analysis.¹ Forty-eight of the students in the remaining classes did not indicate their ethnic background and were excluded from the analysis. Of the remaining sample, 728 students in 55 school classes belonged to the Dutch ethnic majority group. Of these Dutch students, 28.8% were in 23 school classes of the lowest academic track, 47.3% belonged to 23 classes of the medium academic track, and 23.9% were in 9 classes of the highest academic track. These students had classmates from 65 different ethnic groups, of which the largest groups were 103 Turkish-Dutch students (in 34 classes) and 36 Moroccan-Dutch students (in 22 classes). In the interest of improving readability, we will refer to these students simply as being Turkish and Moroccan.

2.2. Procedure

Before data collection, parents received an information letter that offered them the opportunity to reject their child's participation in the study. In addition, students were informed that their answers would be treated confidentially, and that they were free to discontinue participation. Per school class, all students simultaneously completed the questionnaire online on separate computers in their school's computer lab. A teacher read instructions to the students and supervised completion of the questionnaires, which took 30 min on average.

2.3. Variables

Outgroup attitudes. Students' attitudes toward Turkish and Moroccan people, the two largest ethnic minority groups in the city of Arnhem, were measured using four questions at T0 and T2. Students could indicate on 7-point scales how much they agreed with each of the four statements "all [ethnic group] are: (a) *honest*, (b) *friendly*, (c) *smart*, and (d) *helpful*" (1 = *totally disagree*; 7 = *totally agree*) (c.f. [Gijbels and Dagevos, 2005](#); [Vervoort et al., 2011](#)). Only positive dimensions were included in this measurement, because developmental research indicates that children older than 7 years of age are less willing to discriminate between social groups in terms of negative dimensions, whereas they will do so on positive traits ([Bigler et al., 2001](#); [Rutland et al., 2007](#)). Explanatory factor analysis indicated that the items for Turkish and Moroccan people loaded on the same factor. Combined scales for all eight items showed high internal consistencies, with Cronbach's alpha's of .96 at T0 and .98 at T2. Therefore, the items were averaged to form one index measuring outgroup attitudes at each time point. This index ranged from 1 to 7 with higher score indicating more favorable attitudes toward the Turkish and Moroccan ethnic groups.²

Ethnicity. Students' ethnic background was determined by their parents' country of birth. In the Netherlands, birthplace of parents is the main determinant of ethnicity and ethnic minority group students' self-identification ([Verkuyten, 2005](#)). It is therefore commonly used as measurement of ethnicity in sociological research ([Havekes et al., 2013](#); [Schlueter and Scheepers, 2010](#); [Vermeij et al., 2009](#)). According to the official definition of Statistics Netherlands a student was considered Dutch if both parents were born in the Netherlands ([Statistics Netherlands, 2013](#)). If at least one parent was born abroad, the student was assigned to the ethnicity of this parent. If the parents were not born in the same country, the father's country of birth was used.

Number of outgroup classmates. Majority group students' exposure to outgroup classmates was determined by the number of classmates with parents born either in Turkey or Morocco. This number was stable across the school year. Slightly less than half of the sample did not have Turkish or Moroccan classmates ($n = 313$). This group served as a baseline in the analyses. The other students had 1 ($n = 117$), 2 ($n = 109$), 3 ($n = 61$), 4 ($n = 32$), 5 ($n = 12$), 6 ($n = 29$), 7 ($n = 27$), 8 ($n = 22$), or 15 ($n = 6$) Turkish or Moroccan classmates. The last group of six students in one class with 15 Turkish or Moroccan classmates may be considered an outlier. Hence, it was tested whether these outliers affected the results reported below.

Number of liked, neutrally evaluated, and disliked classmates. Students' attitudes toward individual outgroup classmates were measured at T1 and T2. Thus, the lagged measure of interpersonal attitudes was collected three months after the first measure of outgroup attitudes. This minimizes the problem of reversed causality, as liking and disliking at T1 cannot be the cause of outgroup attitudes at T0.

To measure interpersonal attitudes, students were given a complete list of the names of their classmates, and were asked to evaluate each of them on a 9-point scale. The answer scale ranged from 1 = *I don't like the classmate at all* to 5 = *neutral* to 9 = *I like the classmate very much*. The ethnicity of the classmates was not mentioned on this list. Pretests in four classes with students of the same age group who did not participate in our study revealed that the scale was understood as ranging from a very negative evaluation, over a neutral midpoint, and on to a very positive evaluation.

Based on these questions, we constructed separate scales for the number of liked, disliked, and neutrally evaluated outgroup classmates. The number of liked outgroup classmates was operationalized as the number of Turkish or Moroccan classmates nominated on the positive side of the answer scale. The number of neutral relationships was the number of outgroup classmates that were nominated on the neutral mid-point of the scale. The number of disliked classmates was

¹ Two classes did not participate at T2. In two other classes more than 50% of the students transferred to different classes after T1, leaving the composition impossible to compare over time. In two more classes, children answered the questionnaire unsupervised. This led to a high rate of non-response.

² We did not use a differential measure that compares attitudes toward the outgroup to attitudes toward the Dutch because change in this measure in the longitudinal analyses could be caused by change in the attitudes toward the Dutch and not in attitudes toward the outgroup.

represented by the number of classmates nominated on the negative side of the answer scale. Students who had no Turkish or Moroccan classmates scored zero on all three scales and served as a baseline in the analyses. The sum of the three separate scales equals the number of minority members in the classroom of the respective respondent, which is the measure of exposure to outgroup members. The fact that the exposure scale is a linear combination of the three liking scales allows to decompose the statistical effect of exposure into the effects of liking, neutral evaluations, and disliking of members of the outgroup.

We decided to focus on absolute numbers of liked, disliked and neutrally evaluated outgroup members instead of using proportions, because proportions can have a very different interpretation. For example, using proportions would lead to the claim that a student who likes two out of three Turkish classmates has less positive experiences than a student who likes the only Turkish student in his or her class. Using absolute numbers assures that the first student is assigned more positive relationships with outgroup members than the second.

Control variables. Outgroup attitudes have been found to be influenced not only by personal experiences with outgroup members but also by students' academic abilities, the class size, students' ethnic pride, their gender, and their religiosity (Bekhuys et al., 2013; Gniewosz and Noack, 2008; Van Geel and Vedder, 2011; Vervoort et al., 2011). We controlled for students' *academic ability* by the academic track of the school class students attended. The Netherlands knows three academic tracks of which VMBO (preparatory secondary vocational education) is the lowest, HAVO (senior general secondary education) is the medium track, and VWO (pre-university education) represents the highest academic track. The *class size* was the count of students in each classroom at T2. In the Netherlands, students spend the entire school day with the same group of classmates so that class size could be assumed to be stable. *Ethnic pride*, sometimes also referred to as collective self-esteem (Bekhuys et al., 2013), was measured at T2 by asking the students "How proud are you of being Dutch?" Answers could be given on a 5-point scale ranging from 1 = *absolutely not* to 5 = *very much*. *Gender* of students came from school records. Students' *religiosity* was based on two questions at T1. They were first asked, "Are you a member of a church or denomination?" If they answered yes, they were asked how often they did something related to their religious belief. Answer options were *weekly*, *monthly*, *on special occasions*, and *never*.

2.4. Analytical strategy

Random effect (multilevel) analyses were implemented using the lme4 package in R (Bates and Maechler, 2009) because several independent variables (number of Turkish or Moroccan classmates, academic track and class size) were constant within school classes and students were nested within schools. Taking the school and the classroom levels into account allowed estimation of classroom level effects without variables that are linear combinations of each other. Note that R's lme4 package does not estimate standard errors and *p*-values for random effects, because the estimate of a variance component is known to be non-symmetric. To still be able to assess the significance of the class level variance, R's RLRsim package was applied which uses simulation-based exact (restricted) likelihood ratio tests of random effects (Scheipl, 2009). All continuous variables were centered (Snijders and Bosker, 1999). Missing data were imputed using multiple imputation with the package Amelia II (Honaker et al., 2011).³

3. Results

Table 1 presents descriptive statistics for all variables in this study. Independent variables at the class level were the number of classmates from either the Moroccan or Turkish ethnic minority group, the academic track of the class, and the size of the classroom. The dependent variable, attitudes toward Turkish and Moroccan people in general was measured at the individual level. Mean attitudes at T0 and T2 were around the neutral mid-point of the scale, indicating that, on average, ethnic majority group students had neither particularly positive nor very negative attitudes toward the ethnic outgroup. The outgroup attitudes became slightly less positive over time (from $M = 3.91$ to $M = 3.84$), but this change was not statistically significant ($t(676) = 0.84$, $p = .40$).

Students with Turkish or Moroccan classmates reported significantly more liking relationships with outgroup classmates at each time point than neutral relationships (T1: $t(398) = 4.15$, $p < .001$; T2: $t(414) = 2.55$, $p < .05$) or disliking relationships (T1: $t(398) = 3.54$, $p < .001$; T2: $t(414) = 2.30$, $p < .05$). The numbers of neutrally evaluated and dislike outgroup classmates did not differ significantly. The control variables on the individual level were gender (45.5% girls in the entire sample), ethnic pride ($M = 3.98$) and religiosity. Not surprisingly for the Netherlands, most students (67.7%) indicated not being member of a church.

The number of liking, neutral, and disliking relationships with Turkish or Moroccan classmates added up to the total number of classmates from these groups. Accordingly, the liking, neutral, and disliking indicators were highly correlated with the number of Turkish and Moroccan classmates (correlations varied between $r = .64$ and $r = .75$). However, the correlations between the number of liking, neutral, and disliking relationships were only moderate (between $r = .18$ and $r = .22$). These correlations and the correlations of all other variables in the study are shown in Table 2.

³ Results also hold if individuals with missing values are excluded from the analyses.

Table 1Descriptive statistics of all variables (*N* schools = 11, *N* classes = 55, *N* students = 728).

Variable	<i>M</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>	<i>Valid n</i>
<i>Class level</i>					
<i>N</i> of Turkish/Moroccan classmates	1.83	2.51	0	15	55
School type: lowest track	0.29		0	1	55
School type: medium track	0.47		0	1	55
School type: highest track	0.24		0	1	55
Class size	24.07	4.77	9	30	55
<i>Individual level</i>					
Attitudes toward Turks and Moroccans T0	3.91	1.15	1	7	688
Attitudes toward Turks and Moroccans T2	3.84	1.24	1	7	717
<i>N</i> of liked Turkish or Moroccan classmates T1	0.79	1.44	0	8	682
<i>N</i> of neutrally evaluated Turkish or Moroccan classmates T1	0.53	1.09	0	11	682
<i>N</i> of disliked Turkish or Moroccan classmates T1	0.56	1.09	0	7	682
<i>N</i> of liked Turkish or Moroccan classmates T2	0.71	1.36	0	9	728
<i>N</i> of neutrally evaluated Turkish or Moroccan classmates T2	0.56	1.15	0	7	728
<i>N</i> of disliked Turkish or Moroccan classmates T2	0.57	1.20	0	8	728
Ethnic pride	3.98	1.03	1	5	716
Gender (girls)	0.45		0	1	728
Church attendance: never	0.13		0	1	700
Church attendance: weekly	0.03		0	1	700
Church attendance: monthly	0.03		0	1	700
Church attendance: on special occasions	0.12		0	1	700
Church attendance: not religious	0.68		0	1	700

3.1. Cross-sectional analyses

Most variance in students' attitudes toward Turkish and Moroccan people was found between students and not between schools or school classes. However, the empty model (Model 1, Table 3) shows that there was little but still significant variation in students' attitudes toward these ethnic outgroups between schools ($b = .03$, $p < .05$). This variance was completely explained by independent variables that were added in Model 2.

There was evidence for a small but positive effect of the number of ethnic outgroup classmates on Dutch majority group students' outgroup attitudes. The effect of the number of Turkish or Moroccan classmates was only marginally significant ($b = .04$, $p = .06$).⁴

However, it turned out that this result was caused by an outlier, a class with six majority group students and 15 Turkish or Moroccan classmates. When this class was removed from the analyses, the effect turned significant ($b = .05$, $p < .05$). This positive effect of the class composition rejects the notion that group threat would lead to more negative attitudes in situations with larger minority groups. Of the control variables included in Model 2, only the class' academic track was related to students' outgroup attitudes. Those in the medium and highest track had significantly more positive attitudes than students in the lowest track.

There was no indication of a non-linear effect of the class composition. In a supplementary analysis, we found a negative but insignificant effect of the squared number of Turkish or Moroccan classmates on students' outgroup attitudes ($b = -.001$, $p = .76$, Model 1 in Table A1 in the Online Appendix) when the main effect of classroom composition was controlled for. Accordingly, there was no indication of an interplay of a positive exposure effect and a negative group threat effect as it was found elsewhere (e.g., Havekes et al., 2011).

We found support for our new theoretical argument, that the effect of class composition should be decomposed into the number of liking, neutral, and disliking relationships majority students had with their outgroup classmates.⁵ As can be seen in Model 3 of Table 3, the number of liked outgroup classmates was significantly related to outgroup attitudes ($b = .16$, $p < .001$). Students who liked more Turkish or Moroccan classmates had more positive attitudes toward their classmates' ethnic group than students who liked fewer Turkish or Moroccan classmates. The amount of neutral relationships was not related to students' attitudes ($b = .02$, $p = .17$). Finally, more disliking relationships were significantly negatively related to students' attitudes ($b = -.10$, $p < .01$). Students with a higher number of disliked Turkish or Moroccan classmates had more negative attitudes toward Turkish and Moroccan people in general than students with fewer disliking relationships. The standardized coefficients of Model 3 show that the effects of the number of liking and disliking relationships were about as strong as the difference between the school tracks and stronger than the effects of any other variable.

The absolute size of the effect of disliking was not significantly different from the positive effect of liking ($t(1) = 1.14$, $p = .26$). These effects held, even when the one class in which six students had 15 Turkish or Moroccan classmates was

⁴ The proportion of Turkish or Moroccan classmates, as an alternative operationalization of class composition, yielded a very similar result with a positive coefficient that just did not reach statistical significance ($b = .93$, $p = .05$).

⁵ Note that the scale for the number of Turkish or Moroccan classmates is a linear combination of the three scales for liking, neutral, and disliking relationships. Accordingly, the indicator for the number of outgroup classmates cannot be included in this model.

Table 2

Correlations between all variables in the study.

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1. Attitudes T0	1.00																		
2. Attitudes T2	.37***	1.00																	
3. N of Turkish/Moroccan classmates	.06	.05	1.00																
4. N of liking relationships T1	.13**	.15***	.75***	1.00															
5. N of neutral relationships T1	.05	.05	.66***	.21***	1.00														
6. N of disliking relationships T1	-.08	-.11**	.64***	.18***	.22***	1.00													
7. N of liking relationships T2	.15***	.15***	.72***	.69***	.47***	.26***	1.00												
8. N of neutral relationships T2	.003	.02	.64***	.46***	.51***	.31***	.18***	1.00											
9. N of disliking relationships T2	-.04	-.09*	.67***	.33***	.34***	.74***	.20***	.18***	1.00										
10. School type: lowest track	-.06	-.14***	.06	.02	.03	.13**	.03	-.01	.09*	1.00									
11. School type: medium track	-.01	.09*	.12**	.13**	.09*	.01***	.06	.13***	.05	-.60***	1.00								
12. School type: highest track	.07	.04	-.20***	-.17***	-.14***	-.14***	-.11***	-.14***	-.16***	-.36***	-.53***	1.00							
13. Class size	.07	.04	-.14***	-.11**	-.08*	-.10*	-.08*	-.09*	-.10**	-.59***	.38***	.18***	1.00						
14. Ethnic pride	-.01	-.03	.08*	.04	.06	.10	.01	.08*	.07*	.16**	-.02	-.14***	-.19***	1.00					
15. Gender (girls)	.07	.03	.00	.07	-.04	-.07	.09*	-.09*	-.01	-.06	.07	-.02	.13***	-.15***	1.00				
16. Church attendance: never	.01	.004	.02	-.01	.03	-.01	.03	.05	-.04	-.02	-.03	.06	.04	.01	-.02	1.00			
17. Church attendance: weekly	.04	.05	-.03	-.01	-.02	-.04	.004	-.04	-.04	.05	-.08*	.04	-.05	-.01	.03	-.03	1.00		
18. Church attendance: monthly	.01	.01	.04	.04	.00	.06	.08*	-.04	.04	-.09*	.06	.03	.06	-.06	.09*	-.07	-.07	1.00	
19. Church att.: special occasions	-.06	-.07	.08*	.04	.05	.09*	.02	.07	.07	.10*	-.06	-.04	-.14***	.08*	-.05	-.07	-.07	-.15***	1.00
20. Church attendance: not religious	.01	.03	-.08*	-.05	-.04	-.09*	-.08*	-.03	-.05	-.02	.04	-.03	.06	-.01	-.03	-.27***	-.27***	-.55***	-.57***

Note. Case wise deletion of cases with missing values.

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

Table 3

Estimates of cross-sectional multilevel models predicting attitudes toward people of Turkish and Moroccan ethnicity at T2 (summary statistics of ten replications of multiple imputation of missing values).

Variables	Model 1		Model 2		Model 3		
	<i>b</i>	SE	<i>b</i>	SE	<i>b</i>	beta	SE
Intercept	3.80***	.08	3.24***	.22	3.32***		.21
<i>Exposure variables (centered), no outgroup classmates is ref.</i>							
N of Turkish/Moroccan classmates			.04	.02			
N of liking relationships at T2					.16***	.18	.04
N of neutral relationships at T2					.02	.02	.04
N of disliking relationships at T2					-.10**	-.10	.04
<i>Control variables</i>							
School type, lowest is ref.							
Medium track			.44**	.16	.42**	.17	.15
Highest track			.40*	.19	.37*	.13	.18
Class size (centered)			-.02	.01	-.01	-.06	.01
Ethnic pride (centered)			-.02	.05	-.01	-.01	.05
Sex (girls)			.06	.09	.03	.01	.09
<i>Church attendance, never is ref.</i>							
Weekly			.20	.29	.12	.02	.28
Monthly			.55	.29	.49	.07	.28
On special occasions			.18	.18	.15	.04	.18
Not religious			.22	.14	.21	.08	.14
<i>Variance</i>							
Between schools	.03*		.01		.01		
Between classes	.02		.02		.02		
Between students	1.47		1.47		1.43		
Deviance difference			16.67 ^a		39.03*** ^a		

Note. Results for *N* = 728 students nested in 55 classes, nested in 11 schools.

^a Log-likelihood test with Model 1.

* *p* < .05.

** *p* < .01.

*** *p* < .001.

excluded from the analysis. The results could also be replicated when we excluded all classes with no Turkish or Moroccan students (see Table A2 in the Online Appendix).

3.2. Longitudinal analyses

Table 4 presents results from lagged analyses of students' outgroup attitudes. In all models, students' attitudes toward Turkish and Moroccan people at T0 were controlled for. Thus, the variance of the change in students' attitudes between T0 and T2 was left to be explained by the other independent variables. As can be seen in Model 1, there was also significant variation between schools in the longitudinal perspective, which was not explained by the variables that were subsequently added to the model.

There was no evidence for an effect of classroom composition in the longitudinal perspective. Model 2 in Table 4 shows that only the academic track significantly explained change in students' attitudes toward Turkish and Moroccan people. Students in the medium track developed more positive attitudes over time than students in the lowest track. The number of outgroup classmates was not a significant predictor of change in outgroup attitudes (*b* = .03, *p* = .15). Excluding the six students with 15 Turkish or Moroccan classmates (*b* = .03, *p* = .14) as well as using the proportion instead of the number of Turkish or Moroccan classmates did not lead to a significant coefficient (*b* = .65, *p* = .14). Moreover, there was no indication of a non-linear effect of the class composition in the longitudinal model either. The squared number of Turkish or Moroccan classmates had no significant effect on outgroup attitudes (*b* = -.001, *p* = .80, Model 2 in Table A1 in the Online Appendix). Thus, we concluded that classroom composition had no effect on attitude change in our sample.

Results were different in the separate analysis of the number of liked, neutrally evaluated, and disliked outgroup classmates at T1. The number of liked Turkish or Moroccan classmates at the previous time point had a positive and significant effect on attitude change (*b* = .11, *p* < .001, Model 3 in Table 4). Students who reported more liking relationships with outgroup members developed more positive outgroup attitudes over time than students who indicated fewer liking relationships. As expected, more neutral relationships were not related to attitude change. Finally, the number of disliked Turkish or Moroccan classmates was significantly related to the development of more negative outgroup attitudes (*b* = -.11, *p* < .01). The absolute size of the effect was not significantly different from the effect of the number of liked classmates (*t*(1) = 0.01, *p* = .99). The standardized coefficients show that the average effect size of the number of liking and disliking relationships remained relatively stable over time. Also in the longitudinal perspective was the effect of the number of liking and disliking relationships about as strong as the effect of the school tracks.

Table 4

Estimates of lagged multilevel models predicting attitudes toward people of Turkish and Moroccan ethnicity at T2 controlling for attitudes at T0 (summary statistics of ten replications of multiple imputation of missing values).

Variables	Model 1		Model 2		Model 3		
	<i>b</i>	SE	<i>b</i>	SE	<i>b</i>	beta	SE
Intercept	2.25***	.16	1.88***	.24	2.07***		.24
Attitudes at T0	.40***	.04	.40***	.04	.37***	.34	.04
<i>Exposure variables (centered), no outgroup classmates is ref.</i>							
N of Turkish/Moroccan classmates			.03	.02			
N of Turkish/Moroccan classmates ²							
N of liking relationships at T1					.11***	.13	.03
N of neutral relationships at T1					.04	.03	.04
N of disliking relationships at T1					-.11**	-.10	.04
<i>Control variables</i>							
School type, lowest is ref.							
Medium track			.43**	.15	.36*	.15	.15
Highest track			.31	.18	.27	.09	.18
Class size (centered)			-.02	.01	-.02	-.07	.01
Ethnic pride (centered)			-.03	.04	-.02	-.02	.04
Sex (girls)			.01	.09	-.03	-.01	.09
<i>Church attendance, never is ref.</i>							
Weekly			.12	.27	.11	.02	.26
Monthly			.40	.26	.36	.05	.26
On special occasions			.10	.17	.11	.03	.17
Not religious			.14	.13	.12	.04	.13
<i>Variance</i>							
Between schools	.03**		.02*		.02*		
Between classes	.00		.00		.00		
Between students	1.27		1.27		1.24		
Deviance difference	117.58*** ^a		13.88 ^b		29.54** ^b		

Note. Results for $N = 728$ students nested in 55 classes, nested in 11 schools.

^a Log-likelihood test with Model 1 in Table 3.

^b Log-likelihood test with Model 1 in this table.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

These results were robust against outliers. The coefficients remained nearly identical when the one class with six students who had 15 Turkish or Moroccan classmates was removed from the sample. Likewise, effects hardly changed when more rigorous outlier definitions were applied and students were removed that scored 3 standard deviations ($N = 52$) or 4 standard deviations ($N = 14$) above the mean scores for liking, neutral, or disliking relationships. Moreover, when we excluded classes with no Turkish or Moroccan students, the effects were also roughly the same (N liking: $b = .12$, $p < .001$; N dislike: $b = -.11$, $p < .05$) despite the smaller sample size ($N = 415$, see Table A2 in the Online Appendix). Also supplementary analyses with dummy variables indicating at least one liking relationship, at least one neutral relationship, and at least one disliking relationship yielded the same substantive results (see Table A3 in the Online Appendix).

3.3. Consequences in the aggregate

Why was the effect of the number of Turkish or Moroccan classmates rather weak in the cross-sectional analysis and not significant in the longitudinal model? Our analyses showed that the opposing effects of liking and disliking were equally strong. To cancel each other's effect out in the aggregate, there must have been about the same number of liking relationships and disliking relationships in the sample. The effects could have then cancelled each other out within or between students. In the former case, students could have liked and disliked about the same number of outgroup classmates. In the latter case, there could have been about the same number of students with mainly liking relationships and of students who mainly disliked their outgroup classmates.

In the present sample, the positive effect of liking and the negative effect of disliking mainly cancelled each other out between students. To illustrate this, we give a breakdown of our data for students who had Turkish or Moroccan classmates into four separate groups of students. First, those students who reported to like more of their outgroup classmates than they disliked were assigned to the group with mainly positive outgroup relationships. Second, students who were assigned to the group with mainly negative relationships nominated more outgroup classmates on the negative side of the liking scale than on the positive side. Students in the neutral group were those who made only neutral evaluations of their outgroup classmates. Finally, students who indicated to like and dislike an equal number of classmates were grouped together. Fig. 1 presents for each wave the percentage of students in each category.

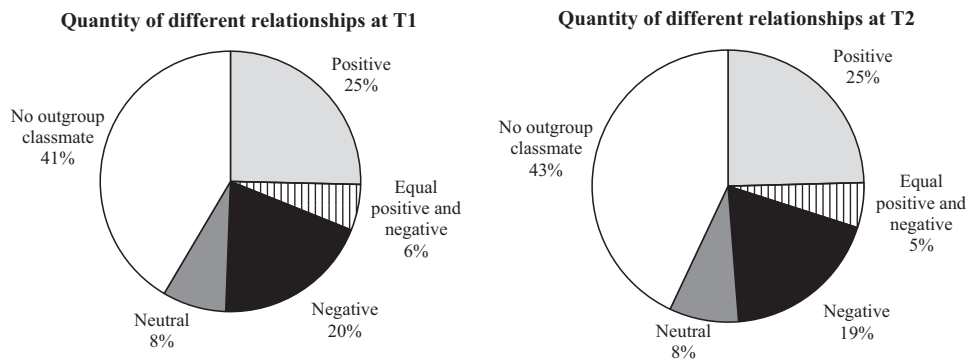


Fig. 1. Percentage of students at T1 and T2 who had no outgroup classmates, who reported more positive relationships, an equal number of positive and negative relationships, or more negative relationships with outgroup classmates. Neutral relationships refers to those students who gave only neutral evaluations of outgroup classmates.

There were about 25% of students with mainly positive relationships at each wave in the sample. Roughly 20% of the students reported more negative than positive relationships. Only 5–6% of students indicated to like and dislike an equal number of outgroup classmates. This suggests that the positive and the negative effects cancelled each other out in the aggregate. Students who liked more of their Turkish or Moroccan classmates developed more positive attitudes toward Turks and Moroccans. Likewise, students who disliked more of their Turkish or Moroccan classmates developed more negative attitudes. In the composite, the increase in positive attitudes of some students and the increase in negative attitudes of other students made it look as if the number of outgroup classmates had no effect on outgroup attitudes.

The specification of having mainly positive or negative relationships with outgroup members allowed testing whether the number of outgroup classmates had an additional effect over and above the quality of the relationships. In supplementary analyses reported in [Table A4 in the Online Appendix](#), we found that mainly disliking Turkish or Moroccan classmates was associated with more negative outgroup attitudes in the cross-sectional and longitudinal analyses.⁶ Having mainly liking relationships had a significantly positive effect in the cross-sectional analysis ($b = .36, p < .05$) but was not a significant predictor in the longitudinal model ($b = .22, p = .12$). The effect of the number of Turkish or Moroccan classmates in the same model was never significant (cross-sectional: $b = .03, p = .23$; longitudinal: $b = .03, p = .23$). These results reinforce our conclusions that it is not the number of outgroup classmates that affects outgroup attitudes. Instead, the quality of the relationships students have with their outgroup classmates determines the effect of contact on outgroup attitudes.

4. Discussion

This research tested a new interpretation of the mixed findings from past research on the influence of ethnic classroom composition on interethnic attitudes (e.g., [Bakker et al., 2007](#); [Ellison and Powers, 1994](#); [Vervoort et al., 2011](#)). We built upon recent research that showed that people generalize both positive and negative attitudes they have about individual outgroup members toward their attitudes toward the outgroup as a whole ([Dolderer et al., 2009](#); [Stark et al., 2013](#)). We argued that the numbers of liking, neutral, and disliking relationships with individual outgroup members on the student-level determine whether outgroup attitudes in the aggregate become more positive, stay the same, or become more negative. We proposed this as an alternative explanation for the mixed findings in the literature, next to older explanations such as group-threat, different school curriculums, varying age of respondents, differences in the dependent variables used, and the influence of omitted variables ([Bekhuis et al., 2013](#); [Vervoort et al., 2011](#)).

Just like in earlier studies, the evidence for an effect of the number of outgroup classmates on students' outgroup attitudes was mixed. There was no significant association in the longitudinal analysis (e.g., [Bakker et al., 2007](#); [Wagner et al., 1989](#)) but the effect was positive, though small, in the cross-sectional analysis (e.g., [Van Geel and Vedder, 2011](#); [Wood and Sonleitner, 1996](#)). This resulted from equally strong generalization effects of liking and disliking outgroup classmates on students' outgroup attitudes. Between students, these two effects cancelled each other out, such that, on average, outgroup classmates seemed to have no effect on outgroup attitudes. This effect was supported by the fact that there were roughly the same numbers of students who reported to like more of their outgroup classmates than to dislike them and of students who reported more disliking relationships. Thus, it appeared that ethnic classroom composition had no effect on the change of students' outgroup attitudes while in fact there were two opposing mechanisms on the student level at play. Some students developed more positive attitudes and an almost equally large number of students developed more negative attitudes.

⁶ Students who liked and disliked an equal number of outgroup classmates were grouped together with those who only indicated neutral relationships in this analysis.

Just being exposed to classmates from other ethnic groups without actually having particularly positive or negative attitudes toward them, did not result in more positive outgroup attitudes. We found that nominating more outgroup classmates neutrally was not related to change in students' attitudes. Future research on ethnic classroom composition may thus be well advised to distinguish between positive, neutral, and negative effects of liking and disliking of outgroup members. Students generalize from their interpersonal attitudes toward members of other ethnic groups toward their attitudes toward the entire ethnic group (Stark et al., 2013). But the consequence of this generalization for students' outgroup attitudes in the aggregate depends on the relative numbers of liking and disliking relationships on the student level.

There was no indication of a negative linear or non-linear effect of the number of outgroup classmates on outgroup attitudes, which would have been in line with group-threat theory or a combination of contact theory and group-threat theory (Moody, 2001; Vermeij et al., 2009; Vervoort et al., 2011). Unfortunately, our data does not allow a more direct test of group-threat theory because perceived threat was not measured. Comparing our new theoretical argument against a direct measure of group-threat might be a fruitful area for future research.

We strengthened the confidence in our results by testing our hypothesis both with cross-sectional and longitudinal data. Even though causality can never be established for sure without an experimental design, the longitudinal analysis gives more confidence in the causal direction of the underlying process. Nevertheless, there may be many other characteristics that affect the development of outgroup attitudes. A promising endeavor for future work might be to use latent class models to identify personal and structural conditions that influence whether students develop more positive or more negative outgroup attitudes.

Another important direction for future work would be to shed light on the origin of positive and negative relationships itself. While this is beyond the scope of our paper, our data allow at least to explore effects of classroom composition on the distribution of liking and disliking relationships. We ran supplementary analyses to test whether the number of Turkish and Moroccan classmates would predict the average liking of these classmates on a scale ranging from -4 (strong disliking) to 4 (strong liking).⁷ The results in Table A5 in the Online Appendix show that average liking was not related to the number of outgroup classmates or any other control variable besides gender.

We also tested whether larger numbers of outgroup classmates led to polarization of liking or disliking relationships. That is, we tested whether having more outgroup classmates increased the tendency to either only like or only dislike individual outgroup representatives. Of the 298 Dutch students who had at least two Turkish or Moroccan classmates at T1, 101 indicated to like at least one Turkish/Moroccan classmate and to dislike none. A total of 72 disliked at least one classmate and liked none. Twenty-five students indicated only neutral relationships. The remaining 100 gave both positive and negative nominations. The tendency to only give one-sided nominations (only liking or only disliking) was negatively related to the number of outgroup classmates ($b = -.17, p < .05$), showing that there was no polarization of interpersonal relationships in classes with more outgroup students. Instead, the more Turkish or Moroccan classmates a student had, the higher the likelihood that at least one was liked and one was disliked. This also did not change over time. As can be seen in Fig. 1, there was no increase in the percentage of students who mainly liked or mainly disliked their outgroup classmates.

Thus, we can rule out that the number of minority group classmates was confounded with liking of these classmates, but we must leave it to future research to explain when and why liking or disliking relationships develop. The quality of students' relationship with outgroup classmates most likely partially depend on their pre-existing attitudes toward this group. Future research should thus take the potentially reciprocal relationship between liking/disliking and outgroup attitudes into account. But also the mere-exposure framework (Zajonc, 1968) may help explain under which circumstance positive and negative interpersonal evaluations develop in the absence of actual interpersonal contact (e.g., Crisp et al., 2009).

Despite the overall support for our argument, there are limitations to our work that point to directions for future research. First, the present study investigated ethnic majority group students' attitudes only toward the Turkish and Moroccan ethnic minority groups. However, people of Turkish and Moroccan origin are both groups that are ranked low in the ethnic hierarchy in the Netherlands (Verkuyten and Kinket, 2000), and results may differ for groups with a higher status (e.g., Spanish or German). Moreover, attitudes toward Turkish and Moroccan people may incorporate students' perception of other North African or Asian groups (e.g., Iraqis, Algerians). Liking and disliking of classmates from such groups may have also affected students' outgroup attitudes, which could have caused measurement error. Thus, our results may actually underestimate the effect of attitudes toward individual representatives of an ethnic group on attitudes toward that group. This underestimation is probably small since there were few students from other North African or Asian groups.

As a second limitation, we did not take into account how strong the actual liking and disliking relationships of individual students were toward different classmates. Future research should explore if the effects differ between very strong and very weak liking or disliking evaluations.

Third, our choice of control variables was limited. Consistent with earlier research, we found that students in higher school types held more positive attitudes toward ethnic minority groups than those in lower school types (Gniewosz and Noack, 2008; Vervoort et al., 2011). However, a persistent effect of academic track in the longitudinal model suggests that experiences in different tracks influenced attitudes also over time. Our data does not allow identifying the differences between the academic tracks that caused this effect. Such factors could be multicultural curriculums that may be followed

⁷ We predicted average liking and not the number of liking relationships because the number of such relationships is naturally closely related to the number of Turkish and Moroccan classmates. Only in classes with many Turkish and Moroccan classmates can there be many liking or disliking relationships.

in higher tracks (Verkuyten and Thijs, 2013) or effects from other contexts such as the neighborhood in which students live (Bekhuis et al., 2013). The persistent track effect calls for more longitudinal research into context effects on the change of intergroup attitudes.

5. Conclusions

Our analyses improved upon earlier research in three ways. First, we showed that not only the quality of contact matters (Bekhuis et al., 2013), but that also the *amount* of positive and negative relationships affects outgroup attitudes. Second, we focused on the generalization of attitudes toward individual outgroup members and did not limit our analyses to the quality of actual contact experiences. Some students may not interact with their (disliked) outgroup classmates and would thus indicate to have no intergroup contact (Turner et al., 2007). Third, students could indicate to have both positive and negative relationships with outgroup classmates. Previous research on positive and negative intergroup contact used very different indicators for positive contact experiences (e.g., being helped) and for negative contact experiences (e.g., being exposed to violence), which limits their comparability (Schmid et al., 2008). Other research relied on overall ratings of the contact as being positive or negative (Barlow et al., 2012; Bekhuis et al., 2013), which limits respondents' ability to qualify their experiences.

The distinction between liking, neutral, and disliking relationships between students from different ethnic groups may prove relevant to other fields that have seen mixed findings. The ethnic composition of school classes has, for instance, been related to higher (Benner and Crosnoe, 2011) and lower (Contini, 2013) academic achievements; positive effect on outgroup trust for majority but not for minority group children (Dinesen, 2011); and better adult health for Asians but poorer adult health for African Americans who attended predominantly white schools (Goosby and Walsemann, 2012). Future research may want to test whether these conflicting findings can partially be explained by the quality of students' interethnic relationships.

With regard to racial prejudice, the present research can help policymakers and practitioners fine-tune measures that are supposed to promote integration in ethnically mixed schools. As disliking relationships can harm outgroup attitudes, simply mixing students from ethnic minority and ethnic majority groups in school classes is not sufficient to improve outgroup attitudes. Instead, intervention programs should be applied to promote interpersonal liking and prevent disliking relationships from aligning with ethnic boundaries. Such interventions could make use of the fact that people feel attracted to others who are similar to them (McPherson et al., 2001) and direct students attention to similarities on dimensions other than ethnicity such as similar interests, attitudes, or behaviors (Stark and Flache, 2012). This may promote liking of individual members of other ethnic groups and, in the long run, promote more positive attitudes toward the group as a whole.

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Appendix A. Supplementary material

Supplementary data associated with this article can be found, in the online version, at <http://dx.doi.org/10.1016/j.ssresearch.2014.11.008>.

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