

The Effect of Segregation on Intergroup Relations

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Abstract

Inter-ethnic residential segregation is correlated with intergroup bias and conflict, poorly functioning states and civil societies, weak economic development, and ethnocentric political behavior. As such, segregation has been a subject of long-standing interest. However, segregation has not been assigned in randomized controlled trials, so the observed correlations may be spurious and the mechanism behind these correlations is poorly understood. In two experiments, we randomly assign segregation in a laboratory and demonstrate that segregation affects perceptions of other people and causes intergroup bias in costly decision-making. Rather than segregation merely inhibiting intergroup contact, we demonstrate that segregation directly affects perception and thus can affect intergroup relations even when holding contact constant.

INTRODUCTION

Residential ethnic segregation, the separation of groups in geographic space, is correlated with individual discriminatory behaviors and attitudes (Allport, 1954; Baybeck, 2006; Alesina and Zhuravskaya, 2008; Oliver, 2010; Rothwell, 2012; Uslaner, 2012; Zingher and Steen Thomas, 2014; Dill and Jirjahn, 2014; Enos and Gidron, 2016; Enos, 2017), ethnocentric political behavior (Enos, 2016) low-capacity states and civil societies (Massey and Denton, 1993; Alesina et al., 1999; Gerometta et al., 2005; Alesina and Zhuravskaya, 2008; De Kadt and Sands, 2014;

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Quillian, 2014), poor economic outcomes (Li et al., 2013), and violent conflict (Corvalan and Vargas, 2015). Ethnic segregation is also an ongoing and, by some measures, growing phenomenon in the United States (Lichter et al., 2015) and other industrialized countries (Glitz, 2014).

Because of the profound consequences, the effects of segregation have generated intense interest among academics and policy makers. However, issues of selection have limited researchers' ability to measure those effects. In addition to potential omitted variable bias, reverse causality between segregation and intergroup behaviors and attitudes is also quite plausible. Furthermore, the mechanism through which segregation affects sociopolitical outcomes remains unclear: the mechanism is often assumed to be a lack of intergroup contact (e.g., Ananat and Washington (2009)), but this assumption is rarely tested and, to our knowledge, has never been tested using a randomized controlled trial.

We make two contributions: first, we demonstrate that there is a causal effect of segregation on behavior and attitudes via a randomized controlled trial. Second, we identify a new mechanism for the effects of segregation by holding intergroup contact fixed, thus removing this most commonly assumed mechanism and demonstrating that segregation directly affects behavior via other cognitive channels.

Causal Effects and Mechanisms of Segregation on Intergroup Behaviors

Correlations between segregation and macro-level negative social outcomes are often thought to operate through individual intergroup bias, including mistrust, animosity, and discrimination between members of segregated groups (e.g., Uslaner (2012)). But, research on the causal effect of interpersonal contact on intergroup bias notwithstanding (e.g., Allport (1954)), correlations between aggregate segregation and intergroup bias are consistent with explanations with opposite causal pathways. For example, segregation may reduce the probability of intergroup contact, leading to negative intergroup attitudes. On the other hand, negative attitudes and the subsequent sorting may cause segregation. In fact, tellingly, in the social science literature segregation appears as both a cause (e.g., Ananat and Washington (2009)) and effect (e.g., Massey and Denton (1993)) of intergroup attitudes. And, of course, the relationship between segregation and intergroup attitudes may be spurious; for example, the manipulation of ethnic tensions by politicians (Posner, 2004) could cause negative attitudes in already segregated societies or cause intergroup segregation and intergroup bias simultaneously.

Even if segregation does have a causal effect on attitudes, it may do so through multiple channels, including the effects that aggregate geographic patterns may have on cognition and the way segregation can shape interpersonal experiences, such as contact with individuals from other groups. As such, the mechanisms remain unclear. Meta-analytic (Pettigrew and Tropp, 2006) and quasi-experimental

studies (Levin et al., 2003) demonstrate that sustained, direct interpersonal contact between small-scale groups, such as cohabitation of college roommates, can reduce intergroup bias. However, at large scales, such as the city level, where diversity is shaped by geographic segregation, the relationship between diversity and intergroup relations has produced inconsistent findings (Pettigrew et al., 2010). And importantly, even if interpersonal contact is understood to improve intergroup relations, this does not mean that a lack of interpersonal contact is the exclusive mechanism through which segregation affects intergroup attitudes. As we explain below, segregation may effect attitudes through a cognitive channel of perceptions.

Segregation Increases the Salience of Social Categories

We propose that segregation facilitates categorization, making social categories, such as ethnicity, more cognitively salient and, thus, leading to stereotyping and discrimination (Enos, 2017). Categorization is a basic psychological function in humans, necessary for routine activity. People categorize in order to understand what attributes are attached to an object, including other people. For example, people categorize others to know whether they are “trustworthy” or “friendly” (Kunda, 1999). When dealing with people, the categories used often include social identities, such as ethnicity.

The arrangement of objects in space is one important way humans categorize. The easy accessibility of space in the human mind may mean that people are particularly likely to use space to judge object fit into a category; in fact, it may have been an adaptive trait in human evolution (Crawford and Cacioppo, 2002; Maguire, 2006) and studies of spatial memory have demonstrated the relationship between space and categorization (Hirtle and Jonides, 1985). Segregation facilitates categorization because it is associated with the increased spatial continuity of groups, thus causing spatial and social boundaries to converge (Brewer and Miller, 1984) and making space an easier marker for group membership. For example, if a racial group all lives on one side of town, social and spatial boundaries have converged, thus making the group seem more distinct from other groups.

The salience of a social category has important consequences for perceptions, attitudes, and behaviors. When objects are categorized, people tend to accentuate difference between objects in different categories and minimize the difference between objects within a category (Capozza and Nanni, 1986). People view categorized groups as homogeneous, thinking that members of these groups share attributes (Wilder, 1986), thus individual people are considered more “typical” of a category. Applied to social categories, such as ethnicity or race, categorization promotes stereotyping (Yzerbyt et al., 2001), whereby attributes are perceived to be shared by members of a group and the differences between groups are perceived to be large. Categorization, even when it occurs through the experimental assignment of completely arbitrary group membership, has been demonstrated

to induce ingroup bias in the attribution of traits, willingness to cooperate, and other-regarding behavior (Tajfel et al., 1971; Dunham et al., 2011; Goette et al., 2012).

Based on these considerations, we test three hypotheses, on each of which a non-null finding would indicate that social categories have become more salient because of segregation:

1. Segregation will decrease perceptions of difference within a group and group members will be perceived as “prototypical” representations of their group.
2. Segregation will increase perceived differences between groups.
3. Segregation will increase group-based discriminatory behavior and attitudes.

SIMULATING SEGREGATION IN A LABORATORY

We measured the effects of segregation on perception and intergroup bias using two studies in which segregation was randomly varied and interpersonal contact held constant.¹

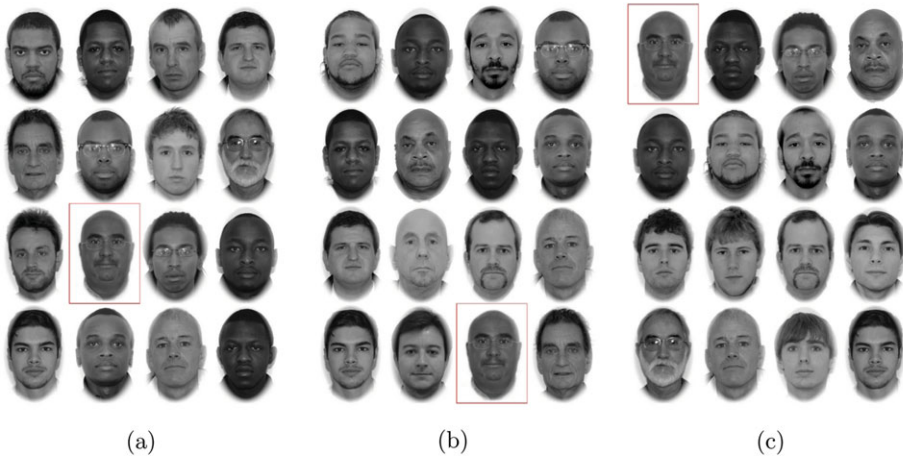
These studies serve as a proxy for the effects of residential segregation on cognition and behavior. Mental representations of space include both *route knowledge*—a linear construct including landmarks and experienced directly, such as by traversing an environment—and *survey knowledge*—a two-dimensional construct including distances and directions and experienced indirectly, such as through conversing or the media (Montello et al., 2004). People can similarly experience segregation directly and indirectly. Thus, we treat subjects with indirect (Study 1) and direct (Study 2) exposure to segregation to capture the multiple ways space is represented in the human mind.

STUDY 1

Study 1 tests whether the segregation of objects promotes stereotyping, whereby segregated objects will be perceived to be more typical of their group and have smaller within-group difference than integrated objects.

We recruited subjects on Amazon’s Mechanical Turk (66% of sample) and the Harvard Digital Lab for the Social Sciences (Enos et al., 2016) (34% of sample) and conducted five separate trials of this experiment with a total of 1,081 subjects. We selected our sample size by recruiting 365 subjects on the Harvard Digital Lab and extrapolating power calculations from this sample. In each trial, we exclude subjects in the bottom and top 5% quantiles of time used to complete the study.

¹Demographic characteristics of respondents, protocols, and detailed results and subgroup analysis for both studies are available in the Supporting Information.

*Figure 1*

Example of Stimuli Used in Study 1. (a) Integrated. (b) Segregated White. (c) Segregated Black.

The substantive conclusions and statistical significance of results are unchanged when including these subjects.

Subjects were exposed to stimuli containing 16 human faces (Figure 1). The faces were from self-identified African American or white individuals. The faces were always either all men or all women. In some cases, the white and African American faces were integrated across the stimulus (Integrated condition) and in some cases, the faces were segregated. On each stimulus, one of the faces was altered using a morphing software (see Supporting Information) to create a face that was racially ambiguous; this face was identified with a red border as seen in Figure 1. In some cases, this ambiguous face was segregated with white faces (White Segregated condition) and in some case with African American faces (Black Segregated condition). Whether the racially ambiguous face was integrated with both white and African American faces or whether the face was segregated with either white or African American faces is the treatment.

In a single trial, each subject was exposed to each stimulus of interest (Integrated, Segregated White, and Segregated Black) in random order, with 24 distraction stimuli included, each for 5 seconds. The distraction stimuli were similar to the stimuli of interest, except with different faces marked. Each subject was exposed to one set of 80 possible different sets of faces, 40 of which were all women and 40 of which were all men, with the racially ambiguous face consistent across the Integrated and Segregated conditions within each of the sets, but with a different face for each of the 80 sets. The placement of faces on the composite image was randomly generated for each set.

Table 1
Results from Five Trials of Study 1

Trial	Race	Beta (SE)	T value	CI	p	N
1	Black	− 0.11 (0.06)	− 1.78	[−0.23,0.01]	0.04	365
	White	0.09 (0.05)	1.74	[−0.01,0.2]	0.04	
2	Black	− 0.18 (0.09)	− 1.99	[−0.35,0]	0.02	148
	White	0.21 (0.08)	2.69	[0.06,0.37]	0.00	
3	Black	− 0.2 (0.08)	− 2.56	[−0.35, −0.05]	0.01	199
	White	0.07 (0.08)	0.85	[−0.09,0.22]	0.20	
4	Black	− 0.11 (0.07)	− 1.49	[−0.25,0.03]	0.07	196
	White	0.1 (0.08)	1.17	[−0.07,0.26]	0.12	
5	Black	− 0.04 (0.06)	− 0.67	[−0.17,0.08]	0.25	208
	White	0.11 (0.06)	1.72	[−0.02,0.24]	0.04	
Pooled	Black	− 0.12 (0.02)	− 4.95	[−0.17, −0.07]	0.00	1081
	White	0.1 (0.02)	6.66	[0.07,0.14]	0.00	

Beta is the difference between response in Segregated versus Integrated Condition. Higher numbers correspond to more “Caucasian” on the Likert scale.

Subjects were asked to rate the “appearance” of the face from “Very African-American” to “Very Caucasian” on a seven-point Likert scale. The quantity of interest is the difference in perceptions of race between the Integrated and Segregated conditions. For each trial, we look within-subjects at differences between the White Segregated and Integrated condition and the Black Segregated and Integrated condition and use a T-test for difference of means. We then pooled the results across trials and assessed the pooled mean differences with cluster-robust standard errors. Our hypothesis is directional, so we report one-tailed p-values, but the rejection of the null-hypothesis at conventional levels of significance ($p < 0.05$) is insensitive to this decision.

Results

If a face was rated as more “Completely Caucasian (African American)” when segregated with white (Black) faces than when integrated with both white and Black faces, we took this as evidence that segregation caused changes in perceptions of the typicality of the face and reduced within group difference. Across each of the five trials (Table 1), perceptions of the face as African American increased when the face was segregated with Black faces and perceptions of the face as white increased when the face was segregated with white faces, allowing us to reject the null hypothesis of no increase in the typicality of faces (pooled result when segregated with Black faces: $\beta = -0.12$, $SE = 0.02$, $t = -4.95$, $p < 0.001$, $95\%CI[-0.17, -0.07]$; pooled result when segregated with white faces: $\beta = 0.10$, $SE = 0.02$, $t = 6.66$, $p < 0.001$, $95\%CI[0.07, 0.14]$; pooled mean when faces are integrated: $\mu = 3.6$, $SD = 1.1$). These results indicate that segregation was causing perceptions of the appearance of the face to move toward the group prototype; white faces were perceived as more white and Black faces were perceived as more Black (hypothesis 1). Thus,

because segregation increases perceptions of typicality, it also causes between-group difference to be perceived as greater (hypothesis 2).

STUDY 2

In Study 2, subjects experience segregation as part of a group. For those experiencing segregation, if it increases the salience of group categories, it should be related to increased perceived differences between groups (hypothesis 2) and intergroup bias (hypothesis 3). The basic design of this experiment is that subjects were randomly assigned to arbitrary groups and these groups were then randomly assigned to be integrated or segregated in space. We pre-registered our design and pre-analysis plan with *egap* on March 11, 2015 (#20150311AA) after conducting a pilot experiment in December 2014 and prior to any data collection.

Subjects from a general population were recruited via Craigslist. We targeted a sample size of 660 participants based on a review of the minimal groups and economic decision-making literature. With no-show participants and unforeseen costs, our final sample was limited to 285 subjects. The study was conducted over a period of 36 sessions at a university campus, with an average of nine subjects per session. We removed one entire session and its paired session because of a pair of subjects who communicated disruptively in the waiting room. Our results are robust to the inclusion of these subjects.

Naive subjects were invited to a laboratory and randomly assigned to one of two arbitrary groups under the guise of uncovering “perceptual type” (Otten and Moskowitz, 2000). Prior to the invitation, subjects were asked to indicate two pairs of experiment times for which they were available. They were then divided into matched pairs based on covariates gathered from an online survey collected during recruitment.² Random assignment to experimental times was then conducted within matched pairs. One of these experimental times was then randomly assigned to the Segregated condition and one to the Integrated condition. To ensure demographic and other covariate balance across arbitrary groups, subjects within each experimental time block were matched and randomly assigned to an arbitrary group. Subjects were randomized into a lecture hall seat (where putative arbitrary group assignment occurred), a waiting room seat, and a private room for response collection.

Assignment to a treatment condition affected subjects’ spatial relationship with other subjects for a period prior to data collection. In the Integrated condition, subjects were randomly assigned seats in a waiting area. In the Segregated condition, subjects were assigned seats in the waiting area so that they were spatially divided by arbitrary group (Figure 2). This varied spatial arrangement in the

²The covariates used were age, gender, race, Hispanic origin, education, political party, political ideology, weight, and height.



Figure 2
Examples of Waiting Room Configurations in Study 2. (a) Integrated. (b) Segregated.

waiting room was the treatment in the experiment. Each subject’s type was denoted by the color of the folder—either orange or purple—placed at their assigned seat that corresponded to subjects being told they were either perceptual Type H or Type Y, respectively. Subjects were directed to this waiting room under the guise of allowing time for the experimenters to prepare rooms for data collection. They remained in silence in this arrangement for 5 min before being given instructions and moved to another location. No interaction between subjects was allowed in either condition. All interactions with the subjects were performed by naive research assistants.

Upon exiting the waiting room, subjects were directed to individual, private rooms and were anonymously asked (1) their perceptions of directly observable, physical attributes of the groups, (2) their perceptions of social attributes of the groups, and (3) their attribution of valence characteristics to the groups and were asked (4) to perform a costly allocation task between members of the groups. All questions were asked about both the group to which the subject had been randomly assigned (Ingroup) and the other group (Outgroup). Tasks 1 and 2 were designed to measure segregation’s effect on perception. Tasks 3 and 4 were designed to measure discriminatory behavior and attitudes.

To measure perceptions of the physical characteristics of the groups, we asked subjects to make their best guess about the age, height, and weight of the average member of each group. We also asked subjects to endorse a statement, using a seven-point Likert-scale, about whether “when it comes to appearance I have things in common” with each group. To measure perceptions of social characteristics, we asked subjects to make their best guess about the income and political ideology of the average member of each group. We also asked subjects to endorse a statement, using a seven-point Likert scale, about whether they had “things in common” with each group. To measure valence attributions, we asked subjects to endorse statements about whether each group was “capable,” “intelligent,” “stupid,” and

“incompetent,” (Sidanius et al., 1994) using a seven-point Likert scale. The ordering of question type and the group about which they were asked were random for each subject. For questions about social and physical characteristics, responses were subtracted from the respondents own values as reported in the recruitment survey, at least, several days before the experiment, and then each was standardized to put on a common scale. Finally, questions of each type were combined by a simple average to form three scales of social perceptions, physical perceptions, and attributions.

For the costly allocation task, subjects played a dictator game in which they were asked to anonymously allocate a portion of \$10 to a randomly selected member of each group and to keep the rest. This is a common measure of willingness to discriminate between groups (e.g., Henrich et al. (2001)). Subjects' allocations were made completely in private with a credible guarantee of anonymity. This task was assigned to 101 subjects, who were randomly sampled from each session. These subjects performed this task before the other tasks.

With all outcomes, we measured difference-in-differences in mean responses to questions about the Ingroup and Outgroup between the Segregated and Integrated conditions. Inference was done using randomization inference (Gerber and Green, 2012), accounting for the blocked assignment of subjects into times, and including covariate adjustments for male (coded 0/1), non-white (0/1), Hispanic (0/1), and college graduate (0/1), which were collected in the recruitment survey. Our results are insensitive to their inclusion. For the physical perceptions scale, due to the free-response nature of the questions, the outer 5th percentile is dropped from the response distribution for each open-ended question.³ Our hypothesis is directional, so we report one-tailed p -values, but the rejection of the null-hypothesis at conventional levels of significance ($p < 0.05$) is insensitive to this decision for two of three of the results we report and all three p -values are less than 0.10 in a two-tailed test.

Results

Subjects in the Segregated condition were more likely to perceive greater differences between the Ingroup and Outgroup in both the social ($\beta = 0.13$, $SE = 0.08$, $p < 0.05$, 95%CI[-0.03 , 0.28]; baselines when integrated: $\mu = -0.07$, $SD = 0.57$) and the physical ($\beta = 0.22$, $SE = 0.09$, $p < 0.01$, 95%CI[0.04 , 0.40] ; baseline when integrated: $\mu = -0.12$, $SD = 0.57$) dimensions than subjects in the Integrated Condition (Table 2).

Importantly, subjects in the Segregated condition had greater intergroup bias in the allocation task, allocating \$0.40 more to the Ingroup over the Outgroup than did those in the Integrated condition ($\beta = 0.40$, $SE = 0.17$, $p < 0.01$,

³See Supplemental Information for results without this trimming.

Table 2
Results of Study 2 for Allocation Task (Row 1), Valence Attributions (Row 2), Social Perceptions (Row 3), and Physical Perceptions (Row 4)

Measures	Beta (SE)	CI	<i>p</i>	<i>D</i>	<i>N</i>
Allocation	0.40 (0.17)	[0.07,0.71]	0.00	0.41	101
Attribution	0.03 (0.09)	[−0.15,0.20]	0.39	−0.01	284
Social perceptions	0.13 (0.08)	[−0.03,0.28]	0.05	0.23	283
Physical perceptions	0.22 (0.09)	[0.04,0.40]	0.01	0.39	174

Beta is the difference between response in segregated versus integrated conditions. *D* is Cohen's *D*.

95%CI[0.07, 0.71]; baseline when integrated: $\mu = -0.17$, $SD = 0.86$), demonstrating that segregation is powerful enough to affect even costly decision making.

However, subjects showed no difference in valence attributions between groups ($\beta = 0.03$, $SE = 0.09$, $p = 0.39$, 95%CI[−0.15, 0.29]; baseline when integrated: $\mu = 0.38$, $SD = 0.76$). This may be because social desirability prevents most respondents from expressing such perceptions.

We also examined results with subjects subset by proximity in order to check whether simple proximity to the Ingroup and Outgroup is driving the different results between the conditions. In the supporting information, we include only subjects who were sitting equidistant from both members of the Ingroup and Outgroup. The results are similar to or stronger than results when we use the full sample.

Conclusion

While we randomly assigned spatial segregation, holding all else constant, we did not test segregation over large-scale spaces, such as metropolitan areas. Extrapolating from the laboratory to real-world segregation gives a sense of how the outcomes we observe will likely be magnified outside the laboratory, where segregation can be large-scale and long-standing. If segregation can influence attitudes and even induce discriminatory behavior when applied to small, arbitrary groups for mere minutes, then consider its power to shape attitudes and behaviors when it is a persistent feature of an environment and is correlated with meaningful social divisions, such as class, ethnicity, and religion.

Our results show a causal relationship and provide a mechanism for a long line of observational studies in natural settings. As such, our results may also have implications for public policy designed to promote ethnic integration. Both government and private efforts, especially in the United States, direct much of their focus on non-residential spaces such as schools and businesses. These policies often rely on theories of intergroup contact to promote equality and harmony sidestepping the issue of integration altogether. Our research suggests that this intergroup contact-only approach may be missing a crucial piece of the puzzle; as

long as residential ethnic segregation persists, the positive effects of diversity in non-residential institutions may be limited by segregation at home.

SUPPLEMENTARY MATERIALS

To view supplementary material for this article, please visit <https://doi.org/10.1017/XPS.2017.28>

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