

Getting under the skin: the impact of terrorist attacks on native and immigrant sentiment *

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Abstract

There is growing academic interest in examining how terrorist attacks shape the majority's attitudes towards minority groups. Yet, little is known of how these minority groups react to the backlash such events provoke. This paper leverages the exogenous occurrence of a series of terrorist attacks during the fieldwork period of two surveys to estimate how such events affect the sentiment of both citizens and asylum seekers in Germany. Results of the natural experiment reveal that the 2016 terror attacks in Nice, Würzburg, and Ansbach substantially increased anti-refugee sentiment among German respondents. In line with this increase in hostility, refugees experienced more discrimination, felt less welcome in Germany, and suffered clinically-relevant declines in mental health in the aftermath of the attacks. These results provide a more holistic understanding of how terrorism corrodes intergroup relations, and how it affects those that are blamed for the events and thus suffer the brunt of the backlash following their occurrence.

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1 Introduction

How does terrorism alter intergroup relations? A number of studies have shown that terrorist attacks generate higher levels of anti-immigrant sentiment among the native population, increase natives' discrimination against minorities in the housing and labour market, and in some cases even provoke xenophobic violence (e.g. Böhmelt, Bove and Nussio 2019; Frey 2020; Legewie 2013; Rabby and Rogers 2010). To what extent, however, do such hostile reactions among the majority population impact the lived experiences of minority groups? Do increasing anti-immigrant attitudes among natives actually affect their behaviour towards, and interactions with, immigrant communities, and even if they do, are such changes even felt by the communities against which this vitriol is directed?

To answer such questions, one of the principal steps in examining how a terrorist attack alters intergroup relations should be to study its impact on both the in-group and the out-group at the same time. Yet, current research on attitudinal change in response to terrorism focuses exclusively on the hardening of attitudes among the majority population, without discussing how these same events may impact the targeted minority group. This is a grave oversight, particularly when considering that minority groups blamed for the occurrence of an attack likely suffer the brunt of backlash in its aftermath.

In this article I set out to address this gap by examining how a series of terrorist attacks impacted the sentiment of both natives and refugee communities in Germany. Within the span of only 10 days in mid-July 2016, three terrorist attacks occurred in Nice, Würzburg, and Ansbach, during which dozens of people were killed and hundreds wounded. Together, the events reignited tensions over immigration policies in Germany, with many drawing parallels between the incidents and the recent

influx of refugees into the country. Coincidentally, two surveys—one of the German and one of the asylum seeking population—were in the midst of gathering survey responses at the time of the events. The fact that the fieldwork periods of both surveys coincide with the timing of the attacks presents a unique opportunity to 1) examine whether terrorism increases anti-refugee sentiment among the native population, while also 2) assessing how these changes in native sentiment affect the targeted refugee population.

Results of the natural experiment provide rare causal insight into how terrorist attacks affect the experiences of both native and immigrant populations. On the one hand, the attacks increased anti-refugee attitudes among Germans: respondents interviewed after the attacks expressed more negative feelings towards refugees and asylum seekers and associated greater risks with their presence in Germany. This increased hostility is mirrored by refugees' own experiences: following the July attacks, refugees reported higher rates of discrimination and felt less welcome in Germany than when they had first arrived. Alarming, the terrorist attacks not only increased exposure to discrimination, but also deteriorated mental well-being among refugees. In the immediate aftermath of the events, when reported discrimination was at it highest, refugees also suffered clinically-relevant declines in mental health. Given that the risk of mental health disorders is already far more prevalent among refugee and asylum-seeking communities compared to the general population, and given that even momentary shocks to wellbeing can give rise to secondary stressors with lasting negative mental health consequences, this latter finding is of particular concern.

This paper makes three contributions to the literature on the effect of events on intergroup relations. First, while some work suggests that terror attacks in more

recent years no longer have an effect on xenophobia and anti-immigrant sentiment (Castanho Silva 2018; Larsen, Cutts and Goodwin 2019), this article demonstrates that even a series of remote (Nice) and comparably ‘small’ and non-deadly (Würzburg and Ansbach) terrorist attacks still led to a substantial increase in anti-refugee hostility among the native population. In distinguishing between different immigrant groups, the study shows that this hostility was directed specifically against refugees and asylum seekers—the group blamed for the attacks—but not against other minorities. Second, by relying on information on both Germans and refugees, the study demonstrates that increasing hostility among the majority population does correspond with actual changes in the living experiences of targeted minority groups. In doing so, these findings complement existing research that only focuses on attitudinal change among the majority population by also illuminating how those minority groups perceived to be responsible react to a terrorist attack, and to the increasing hostility and vitriol it generates. They also highlight some of the additional challenges such attacks can pose to refugees amidst an already laborious integration process, by subjecting refugees to considerably more discrimination. Finally, the analysis offers causal evidence that terrorist attacks not only erode intergroup relations, but also adversely affect the mental health and well-being of immigrant communities.

2 Background and theory

In July 2016, three Islamist terrorist attacks occurred in close succession and shocked the German public. On July 14th, a cargo truck was launched into a crowd during Bastille Day celebrations in Nice, France, killing 86 people and wounding hundreds others. Four days later, a 17-year-old asylum seeker severely injured five people with a knife and hatchet on a train near Würzburg, Germany. Finally, on July 24th, a

Syrian asylum seeker detonated a bomb outside a wine bar in Ansbach, Germany, killing himself and injuring 15 others.

These attacks occurred at a time when immigration to Germany was reaching unforeseen heights: between 2014 and 2016, more than 1.3 million applications for asylum were submitted in the country, exceeding the cumulative number of applications in the previous two decades (see Figure A.1 in the Appendix). Though worries over the influx of refugees to Germany were already widespread, the three terrorist attacks further intensified public concerns. Many linked the increased threat of terror to the recent surge in refugee immigration, particularly since both domestic attacks were perpetrated by individuals who had been seeking asylum in Germany.¹ In the weeks following the events, attacks against refugees and their accommodation sites increased across the country (Frey 2020). While the government warned residents against placing all asylum seekers under general suspicion because of the actions of two individuals, others were quick to perceive the terrorist attacks as a result of the increase in domestic refugee presence. “We were right in all our prophecies,” Horst Seehofer, the then minister president of Bavaria and vocal critic of chancellor Angela Merkel’s refugee policy, proclaimed in a statement following the attacks (der Spiegel 2016). According to him and other like-minded commentators, Islamist terrorists had finally arrived in Germany—disguised as asylum seekers and aided by the country’s liberal immigration policy (Connolly 2016).

2.1 Terrorism and native attitudes

One of the first public reactions after a collective threat is to try and identify who is to blame for its occurrence (Carlin, Love and Zechmeister 2013). Following terrorist attacks that are committed by individual members of a subordinate social group,

that group as a whole can be held “collectively liable” for the conduct of their peers (Black 1983). In addition to the individual threat to safety and security, such events therefore also hold the potential to deteriorate intergroup relations more generally, by increasing the salience of group identities and evoking feelings of anxiety, fear, and anger among the majority population (Sniderman, Hagendoorn and Prior 2004; Lickel et al. 2006), particularly when perpetrators are part of an already stigmatised social group (Van Hauwaert and Huber 2020).

Ample evidence demonstrates that the experience of domestic terrorism amplifies the majority’s negative sentiment towards those minority groups perceived to be associated with the perpetrators. Using a series of panel surveys in the United States, Hopkins (2010) finds that natives’ attitudes towards immigration became more restrictive in the weeks following the September 11 attacks, though such sentiment was short-lived. In Europe, the 2004 Madrid and 2005 London bombings increased negative prejudice against Muslim and Arab minorities, respectively (Echebarria-Echabe and Fernández-Guede 2006; Van de Vyver et al. 2016). Similarly, when Dutch film maker Theo van Gogh was assassinated in 2004 by a Muslim extremist, Muslim immigrants were more likely to be perceived as a threat to Dutch culture and to national security by those interviewed in the days after the killing (Boomgaarden and de Vreese 2007).

Such attitudinal reactions are not only confined to the targeted country, but also affect intergroup relations abroad. Using a natural experiment, Legewie (2013) finds that the 2002 terror attacks in Indonesia had a far-reaching impact by deteriorating attitudes towards immigrants across several European countries. The terrorist attacks on September 11th, 2001 not only increased xenophobia within the United States, but also affected anti-immigrant sentiment throughout Europe (Åslund and

Rooth 2005; Schüller 2016). While such distant events may contribute to deteriorating intergroup relations abroad, however, Böhmelt, Bove and Nussio (2019) show that the effect is strongest when the event occurs in neighbouring states. Attitudinal spill-overs propagate most strongly in nearby countries because individual threats to safety and security are felt more urgently if an event occurs close by, and because local media disproportionately covers more proximate events.

Whereas the findings above suggest that terrorist attacks at home and in neighbouring countries consistently exacerbate intergroup conflict, there is some ambiguity as to whether more recent attacks elicit similar reactions. Measuring changes in public sentiment across Europe following the Paris terrorist attacks in January and November 2015, Castanho Silva (2018: 838) finds mostly no effect, concluding that ‘views on immigration and immigrants have, to a certain extent, stabilised across Europe and are less susceptible to shifts from dramatic events.’ Larsen, Cutts and Goodwin (2019) examine anti-refugee sentiment following the 2016 Berlin attacks and also find no evidence of a populist or xenophobic response among German and European residents. The authors conclude that ‘at least in the short term, the European public do not react strongly to terrorist attacks that are perpetrated in other countries’ (Larsen, Cutts and Goodwin 2019: 199).²

Considering the ambiguity surrounding the attitudinal consequences of more recent terrorist attacks, it is important to begin the analysis by establishing whether the July 2016 attacks actually increased anti-refugee sentiment among the German population. Since the attacks were primarily associated with the immigration of refugees to Germany, with both domestic attacks being perpetrated by recently arrived asylum seekers, the events should primarily stoke anti-refugee and islamophobic sentiment rather than deteriorating attitudes towards all foreigners more generally.³

Previous research, however, rarely distinguishes between different minority groups when examining the effect of terrorism on attitudinal change, assuming instead that such events affect natives' attitudes towards the immigrant population as a whole.⁴ Instead, this article compares changes in Germans' attitudes towards asylum seekers to those towards other immigrant and minority groups (people of Polish, Turkish, Italian or Jewish heritage).

2.2 Terrorism and immigrant attitudes

Although terrorist attacks may incite fear and anger among the majority population, the effects are likely more consequential for those local minority groups who become associated with the event, and against whom the resulting increase in vitriol is thus directed. This is because such groups are “doubly exposed” to the detrimental consequences of a terrorist attack. Akin to the rest of the population, out-group members suffer the direct emotional repercussions that follow from a terrorist attack, such as increased levels of anxiety, fear, and sadness. In addition to this direct emotional toll, however, terrorist attacks also indirectly increase the emotional burden by potentially subjecting minority groups to higher levels of hostility and discrimination in subsequent encounters with the majority population. These two sets of worries were palpable during several interviews with refugees in the days after the terrorist attack in Ansbach, where the interviewees, while expressing their sorrow and disgust over the attack, also feared hostile reactions from the native population: many had not walked down the street by themselves since the bombing for fear of being accosted (Zeit Online 2016). Yet, while the effects on the native population have been well-documented, we know surprisingly little about how terrorist attacks impact the attitudes and living experiences of blamed immigrant communities.

This oversight is problematic for three reasons: First, a narrow focus on only the reactions of the native population fails to identify unique challenges such events pose for targeted immigrant groups. Second, research that aims to study how terrorism alters intergroup relations but that only examines attitudinal change among the native population has to assume, rather than measure, that this attitudinal change actually translates into an observable increase in discrimination, and that this change is in turn felt by the targeted immigrant group. This deduction is not obvious, however, given that some events can trigger changes in anti-immigrant attitudes without altering discriminatory behaviour (see Birkelund et al. 2018). Finally, any holistic understanding of how a disruptive event affects intergroup relations necessitates examining its effect on both native and immigrant communities at the same time.

Despite the relative absence of research on attitudinal change among minority groups, there is good reason to believe that terrorist attacks have a considerable negative impact on their living experiences. Most directly, such events hold the potential to drastically increase individual exposure to hostility and physical violence. In the week after the terrorist attacks on September 11, 2001, hate crimes against Arab and Muslim minorities in the United States escalated from less than 1 to more than 200 reported cases (Byers and Jones 2007). In Germany, news of the 2015/16 New Year’s Eve sexual assaults—where groups of young men, many of whom were refugees and asylum seekers, groped and sexually assaulted participants during the New Year’s Eve celebrations in Cologne—caused an unprecedented wave of backlash violence targeting refugees throughout the country (Frey 2020).

In addition to these direct detrimental effects, such events also indirectly corrode minority group members’ experiences by spilling over into various other aspects of

everyday life. Islamist terrorist attacks have been shown to increase the discrimination against Muslims in the housing, labour, and online rental markets, for example (Rabby and Rogers 2010; Wagner and Petev 2019). Law enforcement and the judicial system are also more prone to bias following perceived threats by a minority group. Legewie (2016) shows that police officers in New York City are quicker to use force during pedestrian stops of African Americans following the homicide of fellow officers by Black suspects. Such aggressive policing not only impacts those minorities directly involved in the confrontation, but also damages surrounding communities by for instance impacting the educational performance of local minority youth (Legewie and Fagan 2019) or reducing crime reporting rates (Desmond, Papachristos and Kirk 2016). Even court rulings are susceptible to shifts in public sentiment: non-US citizens tried in local courts in New York City and Washington, DC, received harsher sentences following the September 11 terrorist attacks (Light, Dinsmore and Massoglia 2019).

The criminalisation of immigration at institutional level also accelerates in the aftermath of terrorist attacks. Governments respond to attacks by implementing more restrictive immigration policies under the guise of establishing counter-terrorism strategies (Neumayer 2006). Following the attacks in Würzburg and Ansbach, for example, German chancellor Angela Merkel promised to expedite the deportation of asylum seekers with little chance of remaining in Germany, while other politicians demanded even stronger measures (Peters and Mayr 2016).

Terrorist attacks can thus introduce more hardship, physical violence, and institutional discrimination into the everyday life of immigrant groups. Among those immigrants, refugees and asylum seekers—whose future prospects in a host country are heavily dependent on government policies and the current socio-political climate—are at

highest risk of suffering from sudden shocks that corrode intergroup relations. After examining the impact of the terrorist attacks in Nice, Würzburg, and Ansbach on Germans' attitudes towards refugees, this study therefore explores to what extent these changes in native attitudes correspond to refugees' own experiences of hostility and discrimination.

2.3 Discrimination and mental health

Increasing intergroup hostility in the aftermath of terrorism may not only impede the integration of minority groups, but also affect their mental well-being. Already among natives, catastrophic events have been found to leave a considerable mark on mental health, especially when such events occur closeby. In interviews with city residents in the days following the terrorist attacks in New York City (Schuster et al. 2001) and London (Rubin et al. 2005), some 45% and 30% claimed to suffer from substantial stress. At the same time, minority groups report such symptoms at considerably higher rates (Whalley and Brewin 2007), though the reasons for these differences have been left unexplored. In London, for example, Muslim respondents were twice as likely to experience stress in the days after the 2005 London bombings compared to the rest of the local population (Rubin et al. 2005).

I argue that this may be because, in addition to elevating psychological distress among the population as a whole, terrorist attacks also adversely affect the mental health of minority group members by increasing their exposure to discrimination. Literature on the relationship between racism and mental health treats discrimination as a stressor that negatively affects health outcomes by (1) evoking psychological distress, and (2) encouraging unhealthy stress-induced behaviour such as increased substance abuse or sleep deprivation (Williams and Mohammed 2009). Accordingly,

a range of studies demonstrate that the experience of discrimination is associated with several adverse health outcomes, including depression, anxiety, or psychological and physiological distress, as well as with unhealthy coping strategies (e.g. Burt, Simons and Gibbons 2012; Johnston and Lordan 2012; Monk 2015; Williams and Mohammed 2009). Discrimination need not be personally experienced to have such detrimental effects: vicarious exposure through others and even the mere anticipation of exposure to discrimination itself can suffice to lower individuals' subjective well-being (Williams, Lawrence and Davis 2019; Sawyer et al. 2012).

Such mental health repercussions of domestic terrorism would be particularly problematic for refugee communities, where mental health disorders are disproportionately high: in a meta-study of articles assessing the prevalence of depression and anxiety disorders in adult refugees, Bogic, Njoku and Priebe (2015: 35) conclude that 'refugees may be up to 14 times more likely to have depression and 15 times more likely to have [post-traumatic stress disorder]' compared to the general Western adult population. This elevated vulnerability is not only due to differences in exposure to traumatic events *prior* to migration, but continues to be shaped by experiences *upon arrival* in the host country, possibly due to experiences of discrimination, disillusionment, or precarity (see Bogic, Njoku and Priebe 2015; Walther et al. 2019). Thus far, however, no research has systematically examined how these "post-migratory" experiences shape refugee well-being, and whether terrorist attacks and the backlash that ensues add to the mental health burden that refugees and asylum seekers have to bare.

Methodologically speaking, this research design also provides a unique opportunity to causally assess the impact of discrimination on well-being. In a systematic review of 115 peer-reviewed articles, Williams and Mohammed (2009: 4) note that while, 'almost without exception, studies of discrimination and mental health find that

higher levels of discrimination are associated with poorer mental health status (...), almost all studies are cross-sectional, leaving open the possibility that perceptions of discrimination are a consequence [rather than a cause] of mental health status.’ Since perceived discrimination is ‘reported by subjects without verification of actual events’, differences in perceptions may themselves be endogenous to mental health disparities (Pascoe and Richman 2009:3). Thus, while the inverse relationship between discrimination and mental health is well established, its causal direction is often ambiguous. A rare exception is Bor et al. (2018), who use instances of police killings of unarmed African Americans to demonstrate how rapid increases in perceived injustice corrode mental health among the Black community in the United States. In a similar vein, this research provides first causal evidence of how a terrorist attack affects the mental health of refugees.

3 Data and methods

Given the country’s sudden surge in refugee presence, with 1.2 million registered asylum applications in 2015 and 2016 alone (Bundeszentrale für politische Bildung 2018), Germany constitutes a unique case to explore how terrorist attacks deteriorate everyday interactions between an established native and a rapidly-expanding immigrant population. To do this, the study makes use of two surveys: the ALLBUS German General Social Survey and the IAB-BAMF-SOEP Survey of Refugees in Germany. While the ALLBUS survey comprises a biennial cross-sectional survey which, since 1980, has provided information on the attitudes and behaviours of German residents, the Refugee panel was only recently introduced in 2016 following a joint effort to survey the increasing number of persons seeking protection from violence and political prosecution in Germany (DIW Berlin 2019).⁵ Due to the extensive care

put into the sampling and fieldwork design, the Refugee survey is representative of all refugees and asylum seekers who arrived in Germany between 2013 and 2016 (Kühne et al. 2019).⁶

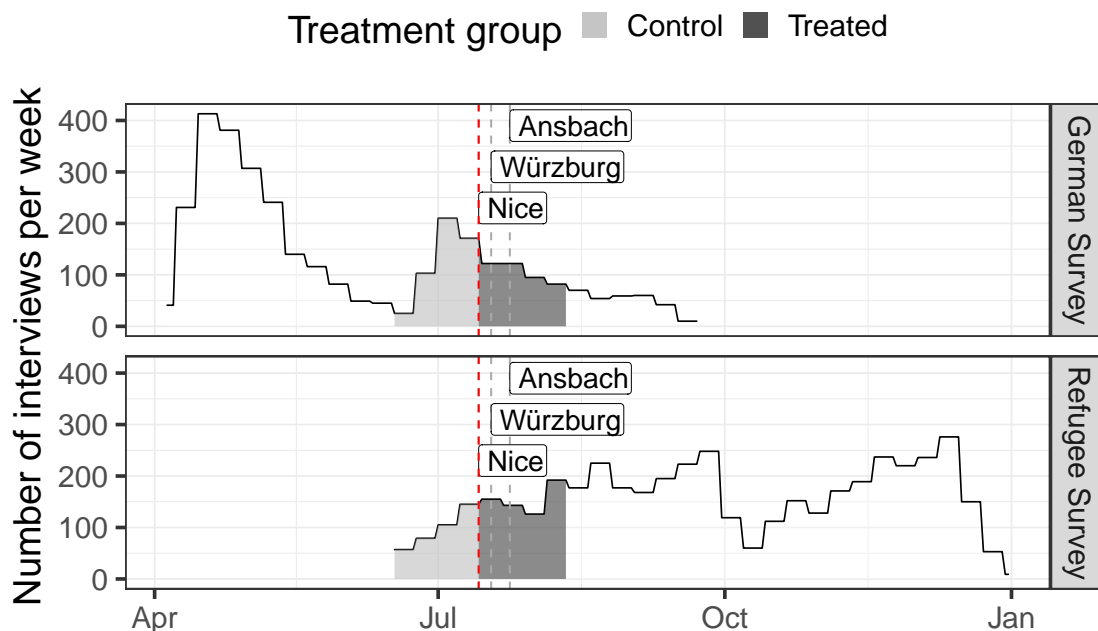
In late July, 2016, the fieldwork period of both surveys overlapped with the terrorist attacks in Nice, Würzburg, and Ansbach (see Figure 1). This constitutes a unique opportunity for a natural experiment: given exogenous variation in exposure to the events, it is possible to examine whether the terror attacks had an impact on the sentiment of Germans and refugees by comparing responses in prior weeks (control group) to those in the aftermath (treated group).⁷ To balance the number of cases against the plausibility of the experimental design, the study only considers respondents who were interviewed in the four weeks leading up to and following the first terrorist attack in Nice, on July 14th, 2016 (see shaded areas in Figure 1).

3.1 Estimation strategy

The paper’s estimation strategy is akin to an event study where, given the exogenous shock of the terrorist attacks, respondents should be assigned to treatment and control groups as good as randomly, depending only on the timing of their interview. Two assumptions are needed to establish a causal effect (Muñoz, Falcó-Gimeno and Hernández 2019): *excludability* (i.e. differences in attitudes between those interviewed before and after the treatment are solely due to the treatment effect) and *temporal ignorability* (i.e. the timing of the interview should be independent from the potential outcomes of Y).

The *excludability* criterion posits that the timing of the interview should not affect the outcome through any other channel but the treatment. Since individuals are split into treatment and control groups based on the date of their interview,

Figure 1: Fieldwork and sample periods of the German and Refugee surveys



Note: Respondents interviewed in the four weeks prior to July 14th, 2016, are part of the control group, while respondents interviewed in the four weeks after July 14th, 2016, are part of the treatment group. Respondents who were interviewed on the day of the first attack itself were removed from the analysis.

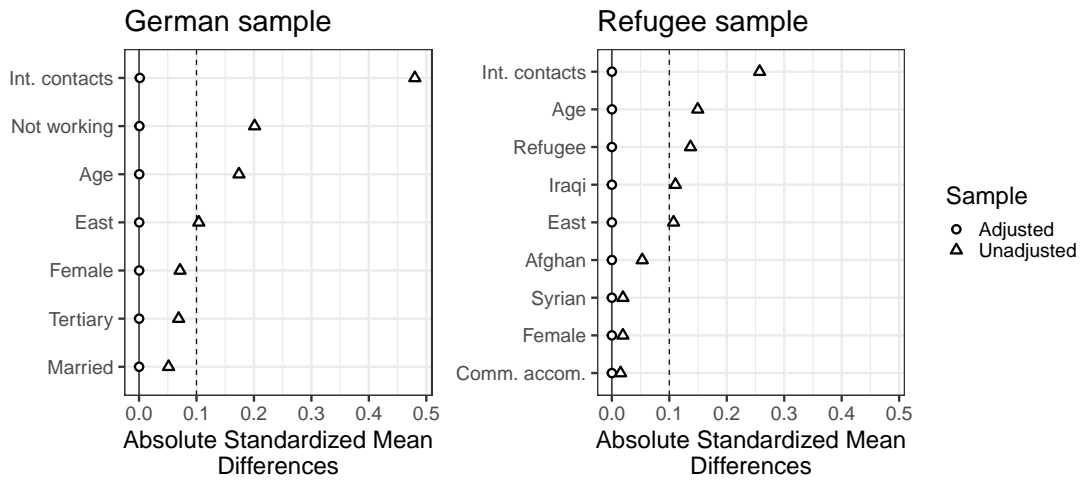
other time-varying variables that are systematically related to the outcome may bias the effect estimates. To reduce such potential biases, I have selected the short window of analysis of only four weeks on each side of the treatment, and further vary that treatment bandwidth in Section P of the Appendix. During the treatment period, one other mass shooting occurred at a mall in Munich on July 21st, killing nine people and wounding thirty-six others. Unlike with the cases considered here, however, the event was classified as a revenge crime, following the alleged bullying of the 17-year-old German-Iranian perpetrator at school. Since this event was not blamed on or brought in connection with the resident refugee population, I therefore do not expect it to have impacted intergroup relations between Germans and asylum

seekers. To scrutinise this expectation, I also run a separate robustness check where I further differentiate between individuals who were interviewed before and after the shootings in Munich on July 21st. Treatment coefficients estimated before and after these attacks do not differ systematically, increasing my confidence in the assumption that the Munich events did not bias the estimated results (see Section E in the Appendix).

The *temporal ignorability* assumption holds that the potential outcomes in Y are independent of treatment assignment. Survey fieldwork designs (where some groups are interviewed at earlier points than others) and differences in reachability (where some groups are harder to reach than others) can violate this assumption and introduce systematic differences between treatment and control groups. Fortunately, both the German citizen and the Refugee surveys contain information on the number of prior interview attempts for each participant.⁸ Controlling for the number of times each respondent was contacted thus accounts for differences in reachability. In addition to this, I also examine whether respondents who are in the treatment and control groups differ in terms of age, sex, and geographic location, as well as in terms of education, employment status, and marital status (for German respondents). For the refugee sample, differences in legal status and the high housing mobility during the refugee crisis may have affected response rates among hard-to-reach population groups (see Kühne et al. 2019). I therefore also include information on respondents' refugee status, country of origin, and type of accommodation. Whereas language barriers are usually another source of bias, the Refugee survey went to great lengths to ease such concerns by providing all interview materials in seven different languages: German, English, Arabic, Farsi, Pashto, Urdu, and Kurmanji (Kühne et al. 2019).

Figure 2 suggest that balance on covariates is already very high for both samples. However, the matched sample—where observations are matched using entropy balancing (Hainmueller 2012)—further improves the balance across both samples. In addition to conditioning on these set of variables in the main regression analysis, I therefore also repeat all estimations using the entropy re-balanced sample in Section I of the Appendix, and results are robust to this change.

Figure 2: Covariate balance across treatment and control groups in the Refugee and German citizen surveys.



Note: Entries report the standardised mean covariate differences between the treatment and the control groups. The adjusted sample was preprocessed using entropy re-balancing.

Following the conditional ignorability assumption ($Y_i(0) \perp Y_i(1) \mid X_i$), I estimate the causal effect of the terrorist attacks on attitudinal change using the equation:

$$Y_i = \alpha + X_i' \beta + \delta T_i + \epsilon_i$$

Where T_i is a binary variable that differentiates between respondents interviewed prior to the attacks (control group) and those interviewed in the aftermath (treatment

group), so that δ identifies the estimated effect of the terrorist events on attitudinal change, conditional on pre-treatment covariates X_i . Note that this design considers exposure to all events together, and so only distinguishes between those who were not exposed to a recent attack, and those who were exposed to one or more attacks. This is due to restrictions in sample size: since all attacks occurred within very close proximity, there are only few respondents who witnessed only one but not two or three attacks. Still, in Appendix Section J I further differentiate between exposure to each individual event, and the resulting point estimates are similar in size and magnitude. Alternatively, in Section K, I exclude all respondents who were only exposed to Nice from the analysis, given that the attack occurred outside of Germany and, while rhetorically linked to the refugee crisis in the German media, was not itself perpetrated by a refugee or asylum seeker. Results also remain robust to this change.

3.2 Dependent variables

To paint as broad a picture of the impact of the terrorist attacks on the two populations as possible, the study assesses their effect on a range of dependent variables. For German respondents, the analysis explores whether the events heightened negative emotions toward, risk assessments of, and perceived social distance to asylum seekers. Conversely, for refugee respondents the analysis assesses whether the attacks increased refugees' negative living experiences in Germany and adversely impacted mental health and well-being. Since most of the missingness occurs at the level of the dependent variables, missing values were imputed using random forests to maximise the number of observations across regressions and to improve comparability (Stekhofen and Bühlmann 2012).⁹

3.2.1 Survey of German citizens

Among other items, the ALLBUS survey includes an array of questions concerning respondents' attitudes towards refugees and asylum seekers. These items are used as dependent variables to examine how Germans' (1) feelings towards, (2) risk perceptions of, and (3) perceived social and cultural distance from refugees change following the terrorist attacks.

A set of survey questions required respondents to describe their feelings towards different minority groups, including asylum seekers. Interviewees were asked to what extent they agree or disagree with four different emotional positions towards minorities: pity, fear, anger, and affection. I summarised these responses in a single factor variable measuring overall negative sentiment towards asylum seekers (using principal component analysis), and also converted each emotion into a separate binary dependent variable to illustrate whether the attacks had a stronger impact on some emotional states over others.¹⁰

The questionnaire also contained a set of items gauging the extent to which respondents associate refugees with risks to public safety, social cohesion, as well as to the welfare state and economy. For each of these topics, interviewees were asked to rate on a five-point scale whether refugees constitute a risk (1) or an opportunity (5) for the future of Germany. As before, each of these items was recoded into a separate binary variable as well as summarised into a single factor variable, which captures the extent to which citizens perceive refugees and asylum seekers as a general risk for the future of Germany.¹¹

Finally, two questions were used to estimate the effect of the attacks on perceived social distance: (1) the extent to which interviewees were uncomfortable with having a refugee as their neighbour, and (2) the degree of perceived difference between the

lifestyle of refugees and Germans (both ranging from 1 to 7). Both variables were reordered so that higher values indicate more perceived social distance. Table 1 includes the summary statistics for all variables for the German sample.¹²

Table 1: Summary statistics (German sample)

	Control			Treatment		
	N	Mean	SD	N	Mean	SD
Emotions						
Neg. emotions (factor)	521	-0.14	1.53	438	0.08	1.46
Anger	521	0.23	0.42	438	0.29	0.45
Fear	521	0.30	0.46	438	0.37	0.48
Pity	521	0.78	0.41	438	0.77	0.42
Affection	521	0.46	0.50	438	0.40	0.49
Risk						
Risk (factor)	521	-0.11	1.67	438	0.00	1.58
Welfare state	521	0.62	0.48	438	0.64	0.48
Social cohesion	521	0.45	0.50	438	0.51	0.50
Safety	521	0.68	0.47	438	0.74	0.44
Economy	521	0.38	0.49	438	0.40	0.49
Social distance						
Cultural difference	521	5.64	1.25	438	5.65	1.26
Neighbour	521	4.55	1.48	438	4.67	1.44
Independent variables						
Female	521	0.50	0.50	438	0.47	0.50
Age	521	53.24	17.76	438	50.27	17.64
East	521	0.31	0.46	438	0.35	0.48
Int. contacts	521	1.58	0.49	438	1.81	0.51
Tertiary	521	0.37	0.48	438	0.39	0.49
Married	521	0.57	0.50	438	0.56	0.50
Not working	521	0.45	0.50	438	0.35	0.48

Fortuitously, the German survey also required respondents to rate their emotions and perceived social distance towards other minority groups. To check the robustness of my estimates, I can thus compare changes in anti-refugee sentiment following the terrorist attacks to changes in perceptions of Italian, Polish, Jewish, and Turkish groups. This comparison will also reveal whether the July 2016 attacks increased anti-refugee sentiment specifically, or fuelled more general anti-immigrant attitudes.

3.2.2 Survey of Refugees

In 2016, the IAB-BAMF-SOEP Survey of Refugees interviewed 4,817 refugees and asylum seekers to obtain information on the integration efforts and living conditions of the recent arrivals in Germany. I use this dataset to examine whether changes in xenophobic sentiment among the German population actually translated into heightened perceived hostility and mental distress among refugees and asylum seekers.

Hostility Three items from the survey questionnaire were used to examine changes in refugees' exposure to hostility following the July 2016 attacks: first, refugees were asked whether they had recently experienced any discrimination on the basis of their origin. I recode this item from a three-level to a binary variable, where 0 indicates no experience of discrimination, and 1 some or frequent discrimination. Second, respondents were asked about a list of concerns, including their worry about the level of anti-immigrant sentiment in Germany. Following the same approach as above, I transform this item into a binary variable, where 0 indicates no concerns about anti-immigrant sentiment and 1 indicates some or strong concerns. Third, I construct a variable measuring whether respondents felt more or less welcome now than at their arrival. For many refugees and asylum seekers, the feeling of being welcome played an important role in their decision to migrate to Germany. Of all survey respondents, 44% listed Germany's "welcome culture" as one of the main reasons for migrating to the country, second only to concerns over human rights protection. The survey includes two questions on how welcome respondents feel, both when they first arrived in the country and at the time of the interview. Using these two items, I construct a continuous variable that measures each individual's change in feeling welcome, where 0 indicates no change and negative scores imply

that the respondent feels less welcome now than at her arrival.

Well-Being Finally, to examine whether the attacks also affected refugees' and asylum seekers' mental well-being, I make use of two indices: the 4-item Patient Health Questionnaire for Depression and Anxiety (PHQ-4) and the 12-item Mental Health Component Summary score. The PHQ-4 is a short and reliable measure of mental distress that has been repeatedly used and validated (Kroenke et al. 2009; Löwe et al. 2010), including most recently in a study of the German refugee population (Walther et al. 2019). The variable consists of four measures that cover the core symptoms of depression and anxiety, yielding a single estimate of mental distress that ranges from 0 (no distress) to 12 (severe distress). The MCS score is obtained from the frequently-used 12-item Short Form Health Survey measure of mental health. Individual scores are generated using exploratory factor analysis and then transformed to range from 0 to 100, with higher scores indicating higher levels of mental health. The average MCS score for the German population is 50, with a standard deviation of 10. Table 2 includes the summary statistics for each of the variables used from the refugee survey.¹³

Table 2: Summary statistics (Refugee sample)

	Control			Treatment		
	N	Mean	SD	N	Mean	SD
Hostility						
Discrimination	386	0.34	0.47	647	0.42	0.49
Anti-immig. worries	386	0.28	0.45	647	0.30	0.46
Feeling welcome	386	0.02	0.81	647	-0.09	0.86
Well-being						
Mental health	386	47.87	12.09	647	47.08	11.55
Mental distress	386	3.20	3.09	647	3.33	2.92
Independent variables						
Female	386	0.34	0.47	647	0.35	0.48
Age	386	33.34	11.30	647	32.15	10.58
East	386	0.18	0.38	647	0.22	0.41
Int. contacts	386	1.61	0.41	647	1.72	0.44
Refugee	386	0.33	0.47	647	0.38	0.49
Syrian	386	0.51	0.50	647	0.49	0.50
Iraqi	386	0.08	0.26	647	0.11	0.31
Afghan	386	0.11	0.32	647	0.09	0.29
Comm. accom.	386	0.37	0.48	647	0.35	0.48

4 Results

Results of the regression analyses are presented below. The figures display the estimated coefficients and confidence intervals (90% and 95%) of the treatment effect across all models, conditioning on all other independent variables. The corresponding regression tables are listed in Section G of the Appendix, alongside a series of robustness checks in Sections I to U. The reported estimates are derived using OLS with heteroskedasticity-consistent robust standard errors.¹⁴ To facilitate a comparison between continuous and binary outcomes, all continuous dependent variables are standardised by dividing by two standard deviations of the control group (Gelman 2008).

4.1 Anti-refugee attitudes

The study begins by examining the impact of the terrorist attacks on native Germans' negative attitudes towards refugees and asylum seekers.

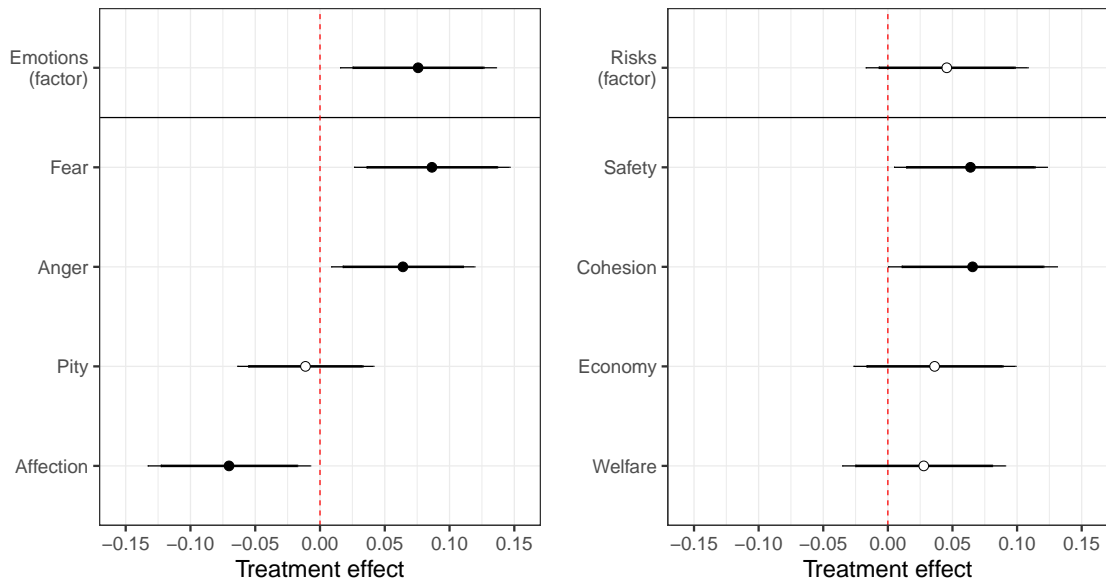
Figure 3a visualises to what extent respondents' anger, fear, pity, and affection towards refugees changed in the aftermath of the terror attacks, and shows that the events substantially increased respondents' fear of and anger toward refugees, while also decreasing feelings of affection. Specifically, respondents who were interviewed in the month after the attacks are 9 percentage points more likely to fear and 6 percentage points more likely to be aggravated by refugees, a substantial 30% and 26% increase from the control group mean. While affection towards refugee groups drops by about 7 percentage points (15%), pity seems to have not been affected by the attacks.

Does this change in sentiment towards refugees reflect a more general increase in xenophobia, irrespective of country origin? In addition to being asked about their emotions towards refugees, respondents were also asked to rate their emotions towards other minority groups in Germany, namely Polish Jewish, Italian, and Turkish residents. Figure H.1 in the Appendix reveals that while resentment of refugees strongly increases in the aftermath of the attacks, feelings towards each of the other groups remain largely unaffected. Rather than causing an undifferentiated increase in xenophobia, the July 2016 attacks seem to primarily spur negative emotions towards refugees—the group deemed to be responsible for the events.

In addition to these emotive reactions, German respondents also associate greater risks with refugees in the weeks following the attacks (see Figure 3b). In line with the perceived nature of the threat, German interviewees are particularly concerned about the threats that refugees pose to safety and social cohesion, while being

somewhat less worried about their impact on the German welfare state or the economy. These substantial effects are particularly striking given that, even prior to the July attacks, respondents were very worried about threats to safety and cohesion. Already in the control group, some 68% of respondents report to be concerned about the safety threat that refugees pose, yet this share increases by an additional 7 percentage points in the aftermath of the attacks.

Figure 3: Impact of the July 2016 terrorist attacks on feelings toward refugees and risk perceptions.



(a) Emotions towards asylum seekers

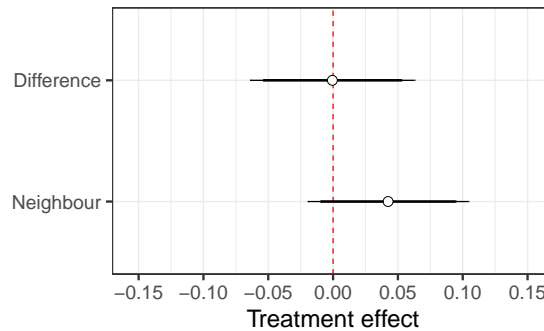
(b) Risks associated with asylum seekers

Note: Black circles summarise the treatment effect estimates across each regression. Results are obtained using OLS with heteroskedasticity-robust standard errors, conditioning on age, sex, place of residence, education, marriage and employment status, and prior interview attempts. Thick and thin lines indicate 90% and 95% confidence intervals, respectively.

Whereas the July 2016 terrorist attacks have a considerable impact on anti-refugee sentiment and risk perceptions, their effect on perceived social distance is more ambiguous. Theoretical insights suggest that while events that pit one group against

the other can spark immediate hostility, anger, and aggression (Lickel et al. 2006), social boundaries develop over longer periods and may thus be less sensitive to sudden shocks (Qian and Lichter 2007). In line with this, Figure 4 showcases that the July 2016 terrorist attacks had less of an effect on perceived social and cultural distance: while Germans’ discomfort with having an asylum seeker as their neighbour increases by 0.09 standard deviations, this effect is statistically insignificant. Perceived differences between Germans and asylum seekers are also not affected by the July 2016 events. Respondents in the control group already perceive refugee communities as very different from their own, even when compared to other minority groups. The mean “social difference” score (which ranges from 1 to 7) is 5.6 for refugees in the control group—compared to 2.7 for Jewish, 2.8 for Polish, 3.0 for Italian, and 4.5 for Turkish communities. This large initial gap does not, however, further increase following the terrorist attacks.

Figure 4: Impact of the July 2016 terrorist attacks on perceived social distance between Germans and Asylum Seekers



Note: Black circles summarise the treatment effect estimates across each regression. Results are obtained using OLS with heteroskedasticity-robust standard errors, conditioning on age, sex, place of residence, education, marriage and employment status, and prior interview attempts. Thick and thin lines indicate 90% and 95% confidence intervals, respectively.

Taken together, results of the German sample demonstrate that the terror attacks

in Nice, Würzburg, and Ansbach lead to a substantial increase in anti-refugee attitudes, increasing negative emotions toward and heightening risk perceptions of refugees and asylum seekers throughout Germany. These results are particularly striking given that for many of the dependent variables used, the baseline rate in the period prior to the events is already very high. In the control group, some 68% of respondents already view refugees as a risk to their personal safety, 63% as a risk to the state, and 45% as a threat to social cohesion. Yet, despite high pre-existing antipathy towards refugees (and potentially dampening ceiling effects), negative sentiment still further increases in the aftermath of the attacks: following the attacks, some 3 in 4 respondents view refugees as a threat to public safety in Germany. Results also indicate that attacks did not cause a broad and indiscriminate increase in xenophobia, but primarily stirred up anti-refugee sentiment among the native population. While recent findings suggest that the impact of terrorism may have subsided, these results clearly showcase that refugees—the group blamed for the attacks—were viewed more negatively by the German public in the weeks that followed.

4.2 Refugees' experiences of hostility

Having established that the July 2016 terror attacks did stoke anti-refugee sentiment, the analysis now turns to examining whether such change in sentiment was in fact felt by the resident refugee population in Germany.

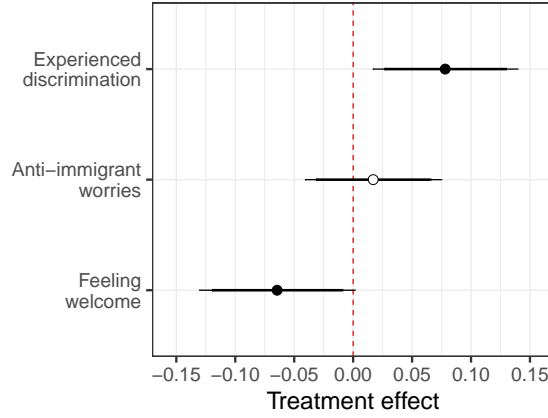
Figure 5 visualises the impact of the terror attacks on refugees' experiences of discrimination, worry over anti-immigrant sentiment, and feelings of being welcome in Germany. As the positive coefficient indicates, refugees interviewed in the period after the attacks were significantly more likely to have experienced discrimination

than those interviewed prior to the events: more specifically, while some 34% of refugees report to have been discriminated against in the control group, this share increases by 8 percentage points to 43% among respondents in the treatment period. This represents a substantial 24% increase, highlighting the considerable impact of the July attacks on refugees' exposure to discrimination in Germany.

Mirroring this increase in discrimination, refugees also feel less welcome in the aftermath of the terror attacks. On average, each respondents' feeling of being welcome drops by 0.12 points (or 0.15 standard deviations) in the treatment period. In fact, there is no observed difference in the extent to which refugees feel welcome between arrival and the interview if the interview was conducted prior to the first attack; it is only after the terrorist attacks that respondents report a relative decline in feeling welcome. Further controlling for refugees' year of arrival in Germany does not affect these results—suggesting that this decrease is not due to differences in the timing of entry into the country. Together with the increased experiences of discrimination, these findings clearly indicate that the surge in anti-refugee sentiment among the majority population match refugees' own experiences of being exposed to more discrimination and hostility in the aftermath of the attacks.

As Figure 5 also suggests, however, this increased hostility does not seem to translate into an elevated concern over anti-immigrant attitudes. Despite the documented increase in negative sentiment towards refugees and a self-reported increase in discrimination, interviewees are not more likely to worry about anti-immigrant attitudes following the July attacks. A closer examination of the complete set of worries listed in the survey reveals that refugees are not nearly as troubled by xenophobic sentiment as they are by other issues. In fact, Figure D.1 in the Appendix visualises that concern over anti-immigrant attitudes ranks last among all listed worries in both

Figure 5: Impact of the July 2016 terrorist attacks on refugee sentiment.



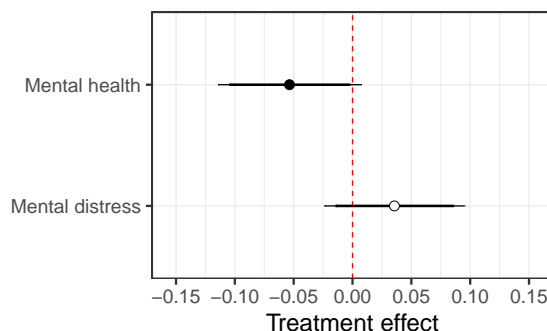
Note: Black circles summarise the treatment effect estimates across each regression. Results are obtained using OLS with heteroskedasticity-robust standard errors, conditioning on age, sex, place of residence, refugee status, country of origin, type of refugee shelter and prior interview attempts. Thick and thin lines indicate 90% and 95% confidence intervals, respectively.

treatment and control group, with only about 30% of respondents being somewhat or very concerned about xenophobia. Instead, most refugees seem to have much more immediate concerns: the large majority worry about their dire economic situation, followed by their future prospects in Germany and in their countries of origin. These worries reflect the precarious position of refugees and asylum seekers in Germany in 2016. At the time of the survey, as few as 3% of respondents report to be in full employment, with many still awaiting a decision over their asylum status. In the presence of other, more pressing problems, such as finding employment, securing permanent residency, or worrying about the precarious situation in their home country, respondents may not have the time or energy to also agonise over less tangible issues like the level of latent xenophobia within the host country.

4.3 Refugees' mental health and well-being

To what extent, then, does the observed increase in anti-refugee sentiment among German citizens and the elevated levels of discrimination affect refugees' mental well-being? Figure 6 visualises the effect of the events on asylum seekers' mental health and emotional distress, and indicates that the attacks had an effect on mental well-being. Refugees who were interviewed during the treatment period report significantly lower levels of mental health, with the MCS score dropping by about 0.10 standard deviations among respondents in the treatment period.

Figure 6: Impact of the July 2016 terrorist attacks on the well-being of refugees and asylum seekers



Note: Black circles summarise the treatment effect estimates across each regression. Results are obtained using OLS with heteroskedasticity-robust standard errors, conditioning on age, sex, place of residence, refugee status, country of origin, type of refugee shelter and prior interview attempts. Thick and thin lines indicate 90% and 95% confidence intervals, respectively.

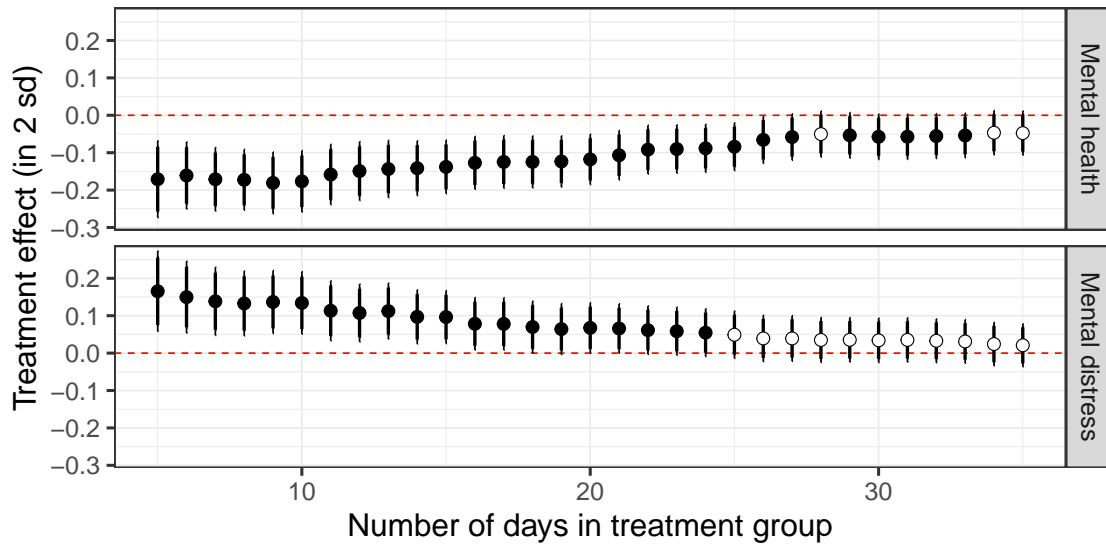
The reported coefficient measuring refugees' mental distress is only slightly positive and statistically insignificant. The emotional toll of terrorism has, however, been shown to be strongest in the immediate aftermath of an attack (Whalley and Brewin 2007). A treatment period of four weeks could in such case conceal stronger short-term effects that abate over time. To explore whether the terrorist attacks had an abrupt but less durable impact on refugees' mental health, I therefore repeat the

analysis above but vary the treatment period to range between 5 and 35 days. Figure 7 visualises the treatment coefficients for each of these regression models and, indeed, provides evidence of a drastic short-term effect. Refugees' mental health and distress suffer most directly following the attacks: in the first five days of the treatment period, respondents report a 0.35 standard deviation decrease in mental health and 0.33 standard deviation increase in mental distress. These changes are not only statistically significant, but also of clinical relevance: two studies in Europe (Vilagut et al. 2013) and Australia (Gill et al. 2007) identify a mental health component score of 45 or less as the screening threshold for detecting depressive disorders. After exposure to the terrorist attacks, refugees' MCS score drops by 4.8 points to 42.1, well below this recommended threshold. While both effects diminish over time, with the coefficient for mental distress becoming statistically insignificant (at $p < 0.1$) after 24 days, the effect on mental health remains statistically significant through most of the treatment period.

These results provide rare evidence that terrorist attacks which are blamed on refugees not only exacerbate hostility among the majority population and increase refugees' experiences of discrimination, but also considerably deteriorate refugees' mental well-being. Terrorist are distressing events, however, and so may affect the mental health of all residents in Germany, refugee or otherwise. The question that remains is whether refugees' mental health was disproportionately affected by the attacks, given the additional exposure to the hostility that followed. To compare the observed effect on mental health among refugees to that of the majority population, I return to the German survey, where respondents were asked to rate their overall wellbeing on a five-point scale. Contrary to the findings above that report a considerable drop in refugee wellbeing, however, Section U in the Appendix

shows that Germans' subjective health assessment does not change following the attacks, with effect estimates remaining close to zero and statistically insignificant throughout the entire period. This comparison suggests that the mental health toll of domestic terrorism may be more pronounced among those groups that are blamed for the events and thus bare the brunt of backlash that follows. It has to be interpreted cautiously, however, given the differences between the two survey items.¹⁵

Figure 7: Dynamic effect of the July 2016 terrorist attacks on wellbeing



Note: Black circles summarise the treatment effect estimates across each regression. Results are obtained using OLS with heteroskedasticity-robust standard errors, conditioning on age, sex, place of residence, refugee status, country of origin, type of refugee shelter and prior interview attempts. Thick and thin lines indicate 90% and 95% confidence intervals, respectively.

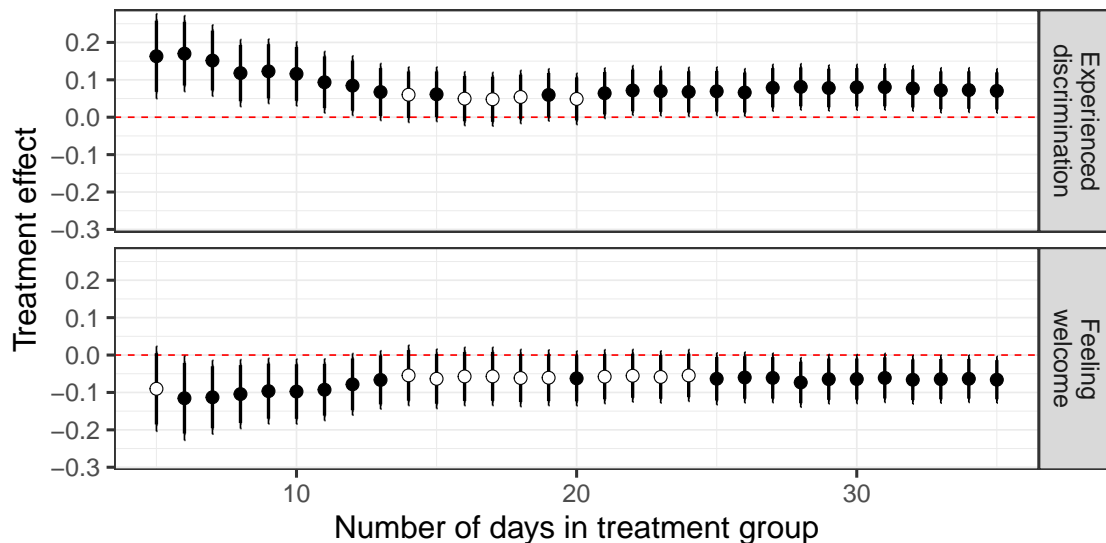
While the negative impact of the terrorist attacks on mental health occurs at a time when refugees report higher levels of discrimination, such simultaneous developments do not necessarily imply a causal relation. The experience of terrorism may be particularly traumatic for refugees and asylum seekers—many of whom will

have fled ongoing war in their home countries—so that the renewed exposure to terrorism may rip open past trauma irrespective of the level of hostility. One way to assess the plausibility of the argument, that terrorist attacks disproportionately impact refugees’ mental health by increasing their exposure to hostility, is to examine whether changes in mental health over time coincide with refugees’ experiences of discrimination over that same period. In Figure 8 I show that when refugees report the lowest levels of mental health in the immediate aftermath of the attacks, they are also most exposed to discrimination. In the first week following the attacks, when refugees’ mental wellbeing is at the lowest level, exposure to discrimination is also at its highest: more than half of all respondents report to have been recently discriminated against. These simultaneous developments underscore the plausibility of the argument that the mental health toll terrorism takes on refugee communities is in part driven by the discrimination such an attack generates.

4.4 Robustness checks and further analyses

Before concluding the results section, I conduct a variety of robustness checks to scrutinise the stability of the estimates, and evaluate alternative scenarios. In Section I I begin by re-estimating the results using an entropy-balanced sample, where treatment and control groups are balanced on observable characteristics (Hainmueller 2012). In Sections J and K I propose different operationalisations of the treatment, taking the compound nature of the treatment and the fact that one of the attacks occurred outside of Germany into account. I also re-estimate a series of logistic regression models in Section L for each of the binary dependent variables used. While I impute missing values in the main analysis, Section M discusses alternative strategies on how to deal with missing observations. Respondents in the treatment

Figure 8: Dynamic impact of the July 2016 terrorist attacks on refugees' exposure to hostility



Note: Black circles summarise the treatment effect estimates across each regression. Results are obtained using OLS with heteroskedasticity-robust standard errors. Thick and thin lines indicate 90% and 95% confidence intervals, respectively.

group were, on average, somewhat harder to reach, and controlling for the number of contact attempts may not suffice to account for these differences in reachability. In Section N, I instead restrict the sample to only those respondents who were relatively easy to reach. Finally, Section O assesses the stability of the results in a more exhaustive manner through a series of specification curves. Across all model specifications, however, the estimated coefficients remain highly similar to those reported above.

While results remain robust to the various specifications, estimates may still be biased if temporal dynamics other than the terrorist attacks are driving the effects. If prior unobserved events already influenced natives' and refugees' attitudes, or if attitudes worsened over time irrespective of the terrorist attacks, then estimated

effects would be biased since interviews for units in the treatment group were conducted at a later stage than those in the control group. I explore these issues in two ways: first, in Section P, I vary the temporal bandwidth used to classify units into control and treatment groups from 4 weeks to 21 and 35 days to see whether estimates are dependent on the chosen cutoff period, but results are robust to this variation. To more exhaustively account for the possibility that prior events or general time trends influenced the results, I generate a series of fictitious events for the period prior to the terrorist attacks and separately re-estimate the models on each of these placebo samples.¹⁶ In Figures Q.1 and Q.2 I plot the coefficients from all placebo models against the estimated effects from the main analysis and show that, across all dependent variables, the estimated effects from the main regressions are larger in magnitude than the placebo coefficients. This increases my confidence in the assumption that the observed changes in sentiment occurred in response to the July 2016 terrorist attacks, and not in response to other temporal dynamics.¹⁷

While recent scholarship has found that natives' attitudes towards immigrants worsens in the aftermath of terrorist attacks, other research argues that such events can also produce momentary surges in solidarity (Collins 2004), which may extend beyond race or ethnicity and so unify rather divide the populace. This sense of "coming together" in the aftermath of an attack could curtail some of the negative reactions that would otherwise follow. In Section S I show that this did not seem to occur following the attacks in Nice, Würzburg, and Ansbach. Respondents interviewed after the attacks felt as close and connected to other Germans and to other Europeans as those who were interviewed prior to the attacks.¹⁸

Public discourse surrounding the refugee crisis often distinguishes between "genuine" refugees, who flee their country due to war or political persecution, and those who

travel to Germany in hopes of better economic prospects, with the public being more inclined to accept the immigration of the former over the latter groups (Bansak, Hainmueller and Hangartner 2016; Czymara and Schmidt-Catran 2017). Thus, while the above results demonstrate that refugees were viewed less favourably after the July 2016 attacks, such negative attitudes may only pertain to those immigrants that are already deemed less deserving of asylum in the first place. In Section T in the Appendix I show that this is not the case: respondents interviewed after the attacks are more inclined to oppose the immigration of asylum seekers, regardless of whether they were fleeing war, political persecution, or dire economic situations.

5 Conclusion

The literature on intergroup relations is increasingly embracing the use of natural experiments to explore how exogenous shocks fuel between-group aggression and stoke conflict. This is a welcome development that sheds more light on the conditions under which events such as terrorist attacks provoke intergroup contention. Current research, however, is still heavily skewed toward only studying how such events affect out-group resentment among the majority population, whereas the recipients of this resentment have received scant scholarly attention. In this study I have argued that this is a problematic oversight, not only because it obscures the unique challenges that targeted groups face, but also because any holistic examination of the impact of terrorism on intergroup dynamics necessitates examining its effect on both groups at the same time.

This article leveraged the coincidental overlap of a series of terrorist attacks with the fieldwork period of two surveys to examine how these events impacted the sentiment of in- and out-group members. Focusing on attitudinal changes

among both the native and the resident refugee population in Germany, the study finds that exposure to terrorism exacerbated anti-refugee sentiment among German respondents, while increasing experiences of discrimination and mental distress among refugees and asylum seekers. German participants interviewed in the aftermath of the attacks felt more negatively toward refugees (exhibiting higher levels of anger and fear, and lower levels of affection) but not towards other minority groups, considered refugees as a greater risk to safety and social cohesion, and were more opposed to their immigration. Mirroring this increase in hostility, refugees reported a substantial 8 percentage point (or 24%) increase in discrimination after the attacks, and felt less welcome than when they had first arrived in the country. This exposure to hostility ultimately seems to have resulted in a marked decrease in psychological well-being among refugee communities, who suffered clinically-relevant declines in mental health in the immediate aftermath of the terrorist attacks, when exposure to hostility was at its highest.

These findings highlight a crucial but often overlooked aspect of intergroup conflict: how blamed minority groups—against which much of the resulting increase in vitriol, discrimination, and violence is directed—react to terrorist attacks. Discrimination can hamper labour market access, impede the search for adequate housing, or decrease interactions between the native and refugee population, and, in doing so, complicate the already laborious integration process that immigrants face upon their arrival. For refugees, whose future prospects in a host country rest on the socio-political climate at the time, such changes in sentiment are likely particularly consequential. Efforts to support integration efforts must prioritise reducing ethnic prejudice among the native population, especially given that immigrants have little sway in counteracting discrimination in the labour or housing markets by themselves

(see Vernby and Dancygier 2019).

At the same time, the focus of this study was how intergroup relations change directly after the unravelling of the attacks. Research on anti-refugee violence demonstrates that similar events that pit one social group against another can have more lasting effects on anti-refugee attacks, and change the level and distribution of violence for the entire subsequent year (Frey 2020). It remains unclear, however, whether changes in everyday interactions between natives and refugees follow similar patterns, or else slowly revert back to a common baseline as news of the event subsides. The slow ebbing off of the effect of the July 2016 terrorist attacks on refugees' mental health suggests that at least some of the effect may only be temporary; but further research to assess this process in greater detail is needed.

Given that terrorist attacks seem to have a severe but only temporary effect on mental health, to what extent should policy makers be concerned with such repercussions? While their direct effect may only be temporary, distressing events can give rise to chronic stressors with more lasting negative mental health consequences, including unhealthy coping behaviour or social isolation (Pearlin 1999). And even when most recover from the immediate negative consequences, a significant minority will likely continue displaying markedly lower levels of mental health for months after the event (Galea et al. 2002). Since, even in the absence of a terrorist attack, refugees and asylum seekers already display markedly lower rates of subjective well-being compared to the general population, policy makers should be keenly aware of any factors that further aggravate the existing disparities in health status.

Unlike with traumatic experiences that occurred prior to arrival, concrete policy measures can be taken to reduce the impact of post-migratory stressors on refugees' well-being, through increased mental health support for refugees following terrorist

attacks, and through efforts to reduce the hostility that follows, for example. Since most of the negative impacts stem from the biases attacks generate among the native population, programs that make the native population more aware of their implicit biases in their interactions with refugees could also lower the brunt of backlash. Ultimately, however, any lasting effort to reduce the detrimental impact of terrorism on intergroup relations has to focus on disrupting the process by which an entire minority group—by simple way of association—is held collectively responsible and vilified for the conduct of a few of its members.

Endnotes

1. Though the attack in Nice was perpetrated by a Tunisian citizen and French resident, media reporting still discussed the event alongside the two subsequent terrorist attacks in Germany. For example, in the day after the Ansbach bombing, the New York Times reported that ‘the language used was nearly identical to that used by the Islamic State after the attacks in Würzburg [and] in Nice, France’ (Eddy 2016). Other outlets referred to the three events more broadly as the “summer of terror” or the “summer of fear” in subsequent reporting (e.g. Connolly and Willsher 2016).

2. Another question that has not received much attention is how durable the effect of terrorism on anti-immigrant attitudes is. The majority of the aforementioned studies focus on the immediate unravelling of native hostility following terrorist attacks (e.g. Böhmelt, Bove and Nussio 2019; Castanho Silva 2018; Legewie 2013), primarily due to methodological considerations: as the time between a terrorist attack and a survey response increases, so does the risk of confounding. Because of this singular focus, it is less clear how terrorism contributes to the formation of attitudes over time. Do attitudes revert back to a common baseline, or is there a cumulative effect, so that hostility increases alongside exposure to terrorism? Panel studies in the U.S. suggest that though there was a strong initial reaction to the September 11 terrorist attacks, this effect quickly subsided (Hopkins 2010).

3. Since the large majority of refugees arriving in Germany during the European refugee crisis came from Muslim-majority countries, many associated their arrival with an increase in the threat of Islamic terrorism in the country. These fears were echoed by political speeches in the immediate aftermath of the attacks, where politicians claimed that terrorists were using refugee travelling routes to enter the country, and thus called for an upper limit to immigration, a strict inspections of refugee shelters, as well as for the deportation of suspects back into their home countries following the attacks (Connolly 2016).

4. For exceptions, see Bar-Tal and Labin (2001), Castanho Silva (2018), and Echebarria-Echabe and Fernández-Guede (2006).

5. The survey was first introduced by the following organisations: The Institute for Employment Research (IAB), the Socio-Economic Panel (SOEP) at the German Institute for Economic Research (DIW Berlin), and the Research Centre on Migration, Integration, and Asylum of the Federal Office of Migration and Refugees (BAMF-FZ) (DIW Berlin 2019).

6. Many steps were taken to address the challenges when surveying refugees and asylum seekers, including drastically reducing the time between initial contact and sampling, extensive interviewer training, and translating all survey materials into seven different languages, among others. Generating a random sample of refugees and asylum seekers in Germany is possible since all foreign residents are registered in the *Ausländerzentralregister*, an administrative list of all foreign residents in Germany. See Kühne et al. (2019) for a list of all steps taken to ensure sample representativeness.
7. Responses from the day of the first attack (July 14th, 2016) were excluded from the analysis.
8. I square this variable to account for its right-skewed distribution.
9. Random forest imputation was performed separately for the German and the Refugee survey, each run with 100 decision trees and a maximum of 20 iterations. In addition to including all variables but the treatment, other measures were added as auxiliary variables to improve the quality of the imputation.
10. Variables were recoded so that “applies completely” and “applies somewhat” were coded as 1, and “does not apply at all” and “does not apply somewhat” were coded as 0. For constructing the factor variable using PCA, the complete variable ranges were used. Figure C.1a in the Appendix visualises the amount of variance explained by each of the components. The first principal component, which is used here, explains 57% of the variance in the variables. See section F for the full set of survey questions used in the analysis.
11. Variables were recoded so that “considerably more risks” and “somewhat more risks” were coded as 1, and “neither risks nor opportunities”, “somewhat more opportunities”, and “considerably more opportunities” were coded as 0. For constructing the factor variable using PCA, the complete variable ranges were used. Figure C.1b in the Appendix demonstrates that the first principal component explains 74% of the variance in the variables.
12. See Section B in the Appendix for correlations between all variables.
13. See Section B in the Appendix for correlations between all variables.
14. Robust standard errors account for the fact that OLS imposes heteroskedasticity for binary dependent variables. See Friedman (2012) and Pischke (2012) for arguments in favour of using Linear Probability Models as an alternative to Logit or Probit regressions. I also repeat all estimations of binary dependent variables using logistic regression models in Appendix Section L, and the relative size and direction of estimates does not change.

15. Whereas the Refugee survey includes a range of questions aimed explicitly at measuring respondents' mental health and wellbeing, the German survey only includes a question which asks respondents to rate their overall wellbeing on a five-point scale. The German survey item therefore arguably captures changes in mental and physical wellbeing, and may therefore be a less precise measure of mental health.

16. Since this strategy relies on a sufficiently large time window in the period prior to the treatment event, this placebo analysis was only possible for respondents from the German survey.

17. In Section R I also explicitly examine whether the 2016 Brexit referendum, which occurred on June 23rd, 2016, may have temporarily improved Germans' attitudes towards refugees, but find no evidence of such an effect.

18. In a discourse analysis of presidential speeches in the aftermath of the two 2015 terrorist attacks in France, Bogain (2019) notes that the political discourse shifted from one characterised by unity following the first attack, to one characterised by military action and retaliation following the second. Though outside the focus of this study, comparative research should assess to what extent public reactions to an event are able to mitigate the occurrence of subsequent intergroup hostility.

References

- Åslund, Olof and Dan-Olof Rooth. 2005. "Shifts in Attitudes and Labor Market Discrimination: Swedish Experiences after 9-11." *Journal of Population Economics* 18(4):603–629.
- Bansak, Kirk, Jens Hainmueller and Dominik Hangartner. 2016. "How Economic, Humanitarian, and Religious Concerns Shape European Attitudes toward Asylum Seekers." *Science* 354(6309):217.
- Bar-Tal, Daniel and Daniela Labin. 2001. "The Effect of a Major Event on Stereotyping: Terrorist Attacks in Israel and Israeli Adolescents' Perceptions of Palestinians, Jordanians and Arabs." *European Journal of Social Psychology* 31(3):265–280.
- Birkelund, Gunn Elisabeth, Tak Wing Chan, Elisabeth Ugreninov, Arnfinn H Midtbøen and Jon Rogstad. 2018. "Do Terrorist Attacks Affect Ethnic Discrimination in the Labour Market? Evidence from Two Randomized Field Experiments." *The British Journal of Sociology* 5(4):1–20.
- Black, Donald. 1983. "Crime as Social Control." *American Sociological Review* 48(1):34–45.
- Bogain, Ariane. 2019. "Terrorism and the Discursive Construction of National Identity in France." *National Identities* 21(3):241–265.
- Bogic, Marija, Anthony Njoku and Stefan Priebe. 2015. "Long-Term Mental Health of War-Refugees: A Systematic Literature Review." *BMC international health and human rights* 15:29.

- Böhmelt, Tobias, Vincenzo Bove and Enzo Nussio. 2019. “Can Terrorism Abroad Influence Migration Attitudes at Home?” *American Journal of Political Science* p. ajps.12494.
- Boomgaarden, Hajo G and Claes H de Vreese. 2007. “Dramatic Real-World Events and Public Opinion Dynamics: Media Coverage and Its Impact on Public Relations to an Assassination.” *International Journal of Public Opinion Research* 19(3):354–366.
- Bor, Jacob, Atheendar S. Venkataramani, David R. Williams and Alexander C. Tsai. 2018. “Police Killings and Their Spillover Effects on the Mental Health of Black Americans: A Population-Based, Quasi-Experimental Study.” *The Lancet* 392(10144):302–310.
- Bundeszentrale für politische Bildung. 2018. “Zahlen Zu Asyl in Deutschland.” (last accessed: July 31st, 2021).
URL: <https://www.bpb.de/gesellschaft/migration/flucht/>
- Burt, Callie Harbin, Ronald L. Simons and Frederick X. Gibbons. 2012. “Racial Discrimination, Ethnic- Racial Socialization, and Crime: A Micro-Sociological Model of Risk and Resilience.” *American Sociological Review* 77(4):648–677.
- Byers, Bryan D. and James A. Jones. 2007. “The Impact of the Terrorist Attacks of 9/11 on Anti-Islamic Hate Crime.” *Journal of Ethnicity in Criminal Justice* 5(1):43–56.
- Carlin, Ryan E., Gregory J. Love and Elizabeth J. Zechmeister. 2013. “Natural Disaster and Democratic Legitimacy: The Public Opinion Consequences

of Chile's 2010 Earthquake and Tsunami." *Political Research Quarterly* .
10.1177/1065912913495592.

Castanho Silva, Bruno. 2018. "The (Non)Impact of the 2015 Paris Terrorist Attacks on Political Attitudes." *Personality and Social Psychology Bulletin* 44(6):838–850.

Collins, Randall. 2004. "Rituals of Solidarity and Security in the Wake of Terrorist Attack." *Sociological Theory* 22(1):53–87.

Connolly, Kate. 2016. "Bavaria Calls for Extra Police and Migrant Crackdown after Attacks." *The Guardian* . (last accessed: July 31st, 2021).

URL: <https://www.theguardian.com/world/2016/jul/26/germany-bavaria-police-attacks-munich-ansbach-wurzburg>

Connolly, Kate and Kim Willsher. 2016. "Summer of fear: the anxious mood in Germany and France." *The Guardian* . (last accessed: July 31st, 2021).

URL: <https://www.theguardian.com/world/2016/jul/29/one-eye-on-the-emergency-exit-the-anxious-mood-in-germany-and-france>

Czymara, Christian S and Alexander W Schmidt-Catran. 2017. "Refugees Unwelcome? Changes in the Public Acceptance of Immigrants and Refugees in Germany in the Course of Europe's 'Immigration Crisis'." *European Sociological Review* 33(6):735–751.

der Spiegel. 2016. "Horst Seehofer und die CSU: Forderung nach neuen Sicherheitsmaßnahmen." *Der Spiegel* . (last accessed: July 31st, 2021).

URL: <https://www.spiegel.de/politik/deutschland/csu-stellt-forderungen-zur-sicherheitspolitik-vor-a-1104813.html>

- Desmond, Matthew, Andrew V Papachristos and David S Kirk. 2016. "Police Violence and Citizen Crime Reporting in the Black Community." *American Sociological Review* 81(5):857–876.
- Deutsche Welle. 2019. "Germany: 2016 Munich Attack Had 'radical Right-Wing' Motives, Say Police." *Deutsche Welle* . (last accessed: July 31st, 2021).
URL: <https://www.dw.com/en/germany-2016-munich-attack-had.-radical-right-wing-motives-say-police/a-50991641>
- DIW Berlin. 2019. "DIW Berlin: IAB-BAMF-SOEP Survey of Refugees in Germany." (last accessed: July 31st, 2021).
URL: [10.5684/soep.iab-bamf-soep-mig.2016](https://www.diw.de/en/iab-bamf-soep-mig.2016)
- Echebarria-Echabe, Agustin and Emilia Fernández-Guede. 2006. "Effects of Terrorism on Attitudes and Ideological Orientation." *European Journal of Social Psychology* 36(2):259–265.
- Eddy, Melissa. 2016. "Suicide Bomber in Ansbach, Germany, Pledged Loyalty to ISIS, Officials Say." *New York Times* . (last accessed: July 31st, 2021).
URL: <https://www.nytimes.com/2016/07/26/world/europe/ansbach-germany-music-festival-explosion.html>
- Frey, Arun. 2020. "'Cologne Changed Everything'—The Effect of Threatening Events on the Frequency and Distribution of Intergroup Conflict in Germany." *European Sociological Review* 36(5).
- Friedman, Jed. 2012. "Whether to Probit or to Probe It: In Defense of the Linear Probability Model." *Development Impact* . (last accessed: July 31st, 2021).
URL: <https://blogs.worldbank.org/impac-tevaluations/>

*whether-to-probit-or-to-probe-it-in-defense-of-the-linear-.
probability-model*

- Galea, Sandro, Jennifer Ahern, Heidi Resnick, Dean Kilpatrick, Michael Bucuvalas, Joel Gold and David Vlahov. 2002. "Psychological Sequelae of the September 11 Terrorist Attacks in New York City." *New England Journal of Medicine* 346(13):982–987.
- Gelman, Andrew. 2008. "Scaling Regression Inputs by Dividing by Two Standard Deviations." *Statistics in Medicine* 27(15):2865–2873.
- Gill, Sarah C., Peter Butterworth, Bryan Rodgers and Andrew Mackinnon. 2007. "Validity of the Mental Health Component Scale of the 12-Item Short-Form Health Survey (MCS-12) as Measure of Common Mental Disorders in the General Population." *Psychiatry Research* 152(1):63–71.
- Goodwin, Matthew and Caitlin Milazzo. 2017. "Taking back control? Investigating the role of immigration in the 2016 vote for Brexit." *The British Journal of Politics and International Relations* 19(3):450–464.
URL: <https://doi.org/10.1177/1369148117710799>
- Hainmueller, Jens. 2012. "Entropy Balancing for Causal Effects: A Multivariate Reweighting Method to Produce Balanced Samples in Observational Studies." *Political Analysis* 20(1):25–46.
- Hopkins, Daniel J. 2010. "Politicized Places: Explaining Where and When Immigrants Provoke Local Opposition." *American Political Science Review* 104(01):40–60.

- Jakobsson, Niklas and Svein Blom. 2014. “Did the 2011 Terror Attacks in Norway Change Citizens’ Attitudes Toward Immigrants?” *International Journal of Public Opinion Research* 26(4):475–486.
- Johnston, David W. and Grace Lordan. 2012. “Discrimination Makes Me Sick! An Examination of the Discrimination–Health Relationship.” *Journal of Health Economics* 31(1):99–111.
- Kroenke, Kurt, Robert L. Spitzer, Janet B. W. Williams and Bernd Löwe. 2009. “An Ultra-Brief Screening Scale for Anxiety and Depression: The PHQ-4.” *Psychosomatics* 50(6):613–621.
- Kühne, Simon, Jannes Jacobsen, DIW Berlin and Martin Kroh. 2019. “Sampling in Times of High Immigration: The Survey Process of the IAB-BAMF-SOEP Survey of Refugees.” *Survey Methods: Insights from the Field* p. 9.
- Larsen, Erik Gahner, David Cutts and Matthew J. Goodwin. 2019. “Do Terrorist Attacks Feed Populist Eurosceptics? Evidence from Two Comparative Quasi-experiments.” *European Journal of Political Research* 59(1):182–205.
- Legewie, Joscha. 2013. “Terrorist Events and Attitudes toward Immigrants: A Natural Experiment.” *American Journal of Sociology* 118(5):1199–1245.
- Legewie, Joscha. 2016. “Racial Profiling in Stop-and-Frisk Operations: How Local Events Trigger Periods of Increased Discrimination.” *American Journal of Sociology* 122(2):379–424.
- Legewie, Joscha and Jeffrey Fagan. 2019. “Aggressive Policing and the Educational Performance of Minority Youth.” *American Sociological Review* 84(2):220–247.

- Lickel, Brian, Norman Miller, Douglas M Stenstrom, Thomas F Denson and Toni Schmader. 2006. "Vicarious Retribution: The Role of Collective Blame in Intergroup Aggression." *Journal of Personality and Social Psychology* 10(4):372–390.
- Light, Michael T., Ellen Dinsmore and Michael Massoglia. 2019. "How Do Criminal Courts Respond in Times of Crisis? Evidence from 9/11." *American Journal of Sociology* 125(2):485–533.
- Löwe, Bernd, Inka Wahl, Matthias Rose, Carsten Spitzer, Heide Glaesmer, Katja Wingenfeld, Antonius Schneider and Elmar Brähler. 2010. "A 4-Item Measure of Depression and Anxiety: Validation and Standardization of the Patient Health Questionnaire-4 (PHQ-4) in the General Population." *Journal of Affective Disorders* 122(1-2):86–95.
- Monk, Ellis P. 2015. "The Cost of Color: Skin Color, Discrimination, and Health among African-Americans." *American Journal of Sociology* 121(2):396–444.
- Muñoz, Jordi, Albert Falcó-Gimeno and Enrique Hernández. 2019. "Unexpected Event during Survey Design: Promise and Pitfalls for Causal Inference." *Political Analysis* pp. 1–21.
- Neumayer, Eric. 2006. "Unequal Access to Foreign Spaces: How States Use Visa Restrictions to Regulate Mobility in a Globalized World." *Transactions of the Institute of British Geographers* 31(1):72–84.
- Pascoe, Elizabeth A. and Laura Smart Richman. 2009. "Perceived Discrimination and Health: A Meta-Analytic Review." *Psychological bulletin* 135(4):531–554.

- Pearlin, Leonard I. 1999. The Stress Process Revisited. In *Handbook of the Sociology of Mental Health*, ed. Carol S. Aneshensel and Jo C. Phelan. Handbooks of Sociology and Social Research Boston, MA: Springer US pp. 395–415.
- Peters, Benedikt and Markus Mayr. 2016. “Merkel: Terror von Flüchtlingen "verhöhnt das Land".” *Süddeutsche.de* . (last accessed: July 31st, 2021).
- URL:** <https://www.sueddeutsche.de/politik/pressekonferenz-merkel-wir-schaffen-das-und-haben-bereits-sehr-viel-geschafft-1.3098808>
- Pischke, Jörn-Steffen. 2012. “Probit Better than LPM?” *www.mostlyharmlesseconometrics.com* . (last accessed: July 31st, 2021).
- URL:** <http://www.mostlyharmlesseconometrics.com/2012/07/probit-better-than-lpm/>
- Qian, Zhenchao and Daniel T. Lichter. 2007. “Social Boundaries and Marital Assimilation: Interpreting Trends in Racial and Ethnic Inter-marriage.” *American Sociological Review* 72(1):68–94.
- Rabby, Faisal and William M III Rogers. 2010. “The Impact of 9/11 and the London Bombings on the Employment and Earnings of U.K. Muslims.” *IZA Discussion Papers* 4763:1–31.
- Rubin, G. James, Chris R. Brewin, Neil Greenberg, John Simpson and Simon Wessely. 2005. “Psychological and Behavioural Reactions to the Bombings in London on 7 July 2005: Cross Sectional Survey of a Representative Sample of Londoners.” *BMJ* 331(7517):606.
- Sawyer, Pamela J., Brenda Major, Bettina J. Casad, Sarah S. M. Townsend

- and Wendy Berry Mendes. 2012. “Discrimination and the Stress Response: Psychological and Physiological Consequences of Anticipating Prejudice in Interethnic Interactions.” *American Journal of Public Health* 102(5):1020–1026.
- Schmidt, Janek, Kate Connolly and Emma Graham-Harrison. 2016. “Munich shooting: killer was bullied teen loner obsessed with mass murder.” *The Guardian* . (last accessed: July 31st, 2021).
- URL:** <https://www.theguardian.com/world/2016/jul/23/munich-shooting-loner-facebook-ali-sonboly-bullied-killer>
- Schüller, Simone. 2016. “The Effects of 9/11 on Attitudes toward Immigration and the Moderating Role of Education.” *Kyklos* 69(4):604–632.
- Schuster, M. A., B. D. Stein, L. Jaycox, R. L. Collins, G. N. Marshall, M. N. Elliott, A. J. Zhou, D. E. Kanouse, J. L. Morrison and S. H. Berry. 2001. “A National Survey of Stress Reactions after the September 11, 2001, Terrorist Attacks.” *The New England Journal of Medicine* 345(20):1507–1512.
- Simonsohn, Uri, Joseph P. Simmons and Leif D. Nelson. 2020. “Specification Curve Analysis.” *Nature Human Behaviour* 4(11):1208–1214.
- Sniderman, Paul M, Louk Hagendoorn and Markus Prior. 2004. “Predisposing Factors and Situational Triggers: Exclusionary Reactions to Immigrant Minorities.” *American Political Science Review* 98(01):35–49.
- Stekhofen, Daniel J. and Peter Bühlmann. 2012. “MissForest—Non-Parametric Missing Value Imputation for Mixed-Type Data.” *Bioinformatics* 28(1):112–118.
- Van de Vyver, Julie, Diane M. Houston, Dominic Abrams and Milica Vasiljevic.

2016. “Boosting Belligerence: How the July 7, 2005, London Bombings Affected Liberals’ Moral Foundations and Prejudice.” *Psychological Science* 27(2):169–177.
- Van Hauwaert, Steven M. and Robert A. Huber. 2020. “In-group Solidarity or Out-group Hostility in Response to Terrorism in France? Evidence from a Regression Discontinuity Design.” *European Journal of Political Research* pp. 1475–6765.12380.
- Vernby, Kåre and Rafaela Dancygier. 2019. “Can Immigrants Counteract Employer Discrimination? A Factorial Field Experiment Reveals the Immutability of Ethnic Hierarchies.” *PLOS ONE* 14(7):e0218044.
- Vilagut, Gemma, Carlos G. Forero, Alejandro Pinto-Meza, Joseph M. Haro, Ron de Graaf, Ronny Bruffaerts, Vivianne Kovess, Giovanni de Girolamo, Herbert Matschinger, Montserrat Ferrer and Jordi Alonso. 2013. “The Mental Component of the Short-Form 12 Health Survey (SF-12) as a Measure of Depressive Disorders in the General Population: Results with Three Alternative Scoring Methods.” *Value in Health* 16:564–573.
- Wagner, Sander and Ivaylo D. Petev. 2019. “The Economic Penalty of Terrorism: Increase in Discrimination Against Arabs and Muslims after Paris Attacks.” *Working Paper* pp. 1–40. (last accessed: July 31st, 2021).
URL: <https://doi.org/10.31235/osf.io/vra4b>
- Walther, Lena, Lukas M. Fuchs, Jürgen Schupp and Christian von Scheve. 2019. “Living Conditions and the Mental Health and Well-Being of Refugees: Evidence from a Large-Scale German Panel Study.” *SOEPpapers on Multidisciplinary Panel Data Research* 1029. (last accessed: July 31st, 2021).
URL: <https://www.econstor.eu/handle/10419/195293>

Whalley, Matthew G. and Chris R. Brewin. 2007. "Mental Health Following Terrorist Attacks." *The British Journal of Psychiatry* 190(2):94–96.

Williams, David R., Jourdyn A. Lawrence and Brigitte A. Davis. 2019. "Racism and Health: Evidence and Needed Research." *Annual Review of Public Health* 40:105–125.

Williams, David R. and Selina A. Mohammed. 2009. "Discrimination and Racial Disparities in Health: Evidence and Needed Research." *Journal of Behavioral Medicine* 32(1):20–47.

Zeit Online. 2016. "Horst Seehofer: "Neue Dimension des Terrors"." *Die Zeit* .

URL: <https://www.zeit.de/politik/2016-07/horst-seehofer-ansbach-attentat-buergerschutz>

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A Number of asylum applications in Germany

As Figure A.1 details, the number of asylum application in Germany drastically increased following the influx of asylum seekers into the country in 2015 and 2016, before tempering off in later years alongside the decline in refugee arrivals following the EU-Turkey agreement on March 18th, 2016.

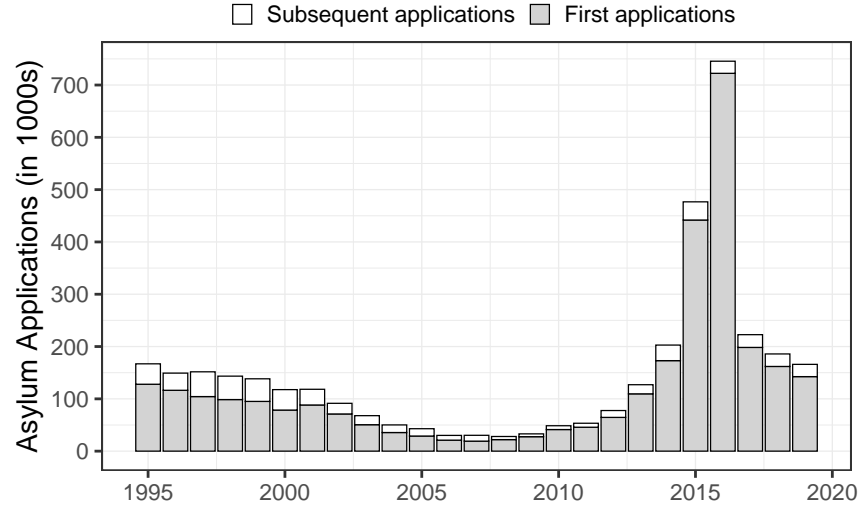
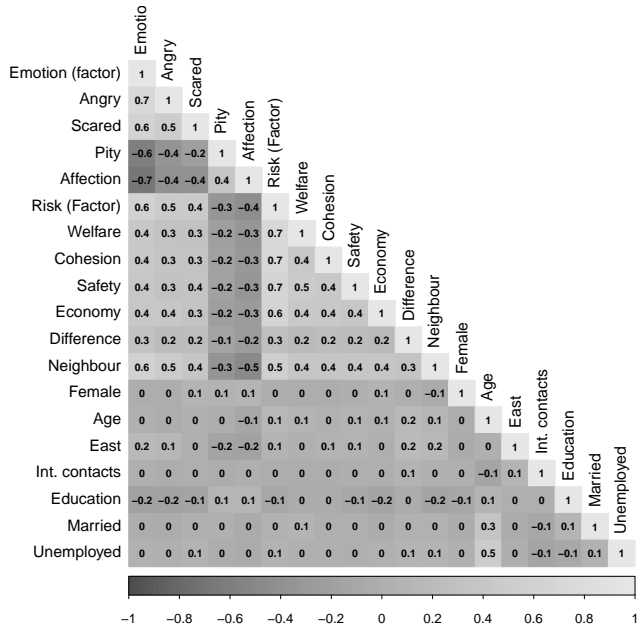
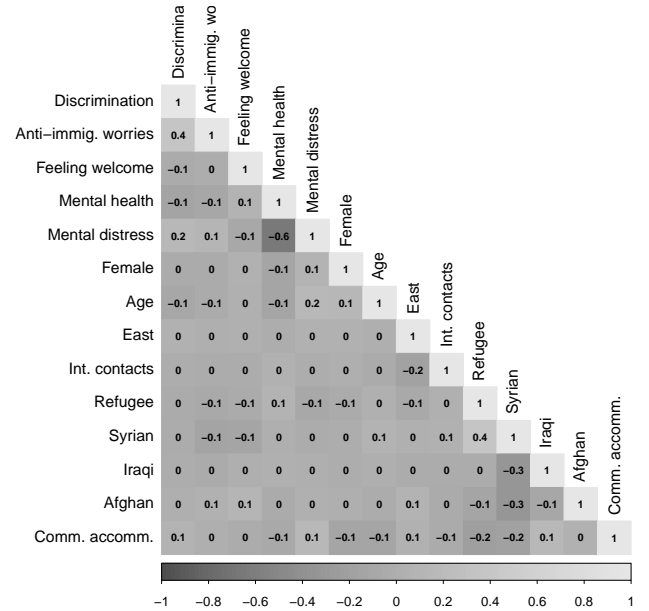


Figure A.1: Number of asylum applications in Germany, 1995–2019

B Correlation matrices



(a) German sample



(b) Refugee sample

Figure B.1: Correlation matrices

C Scree plots

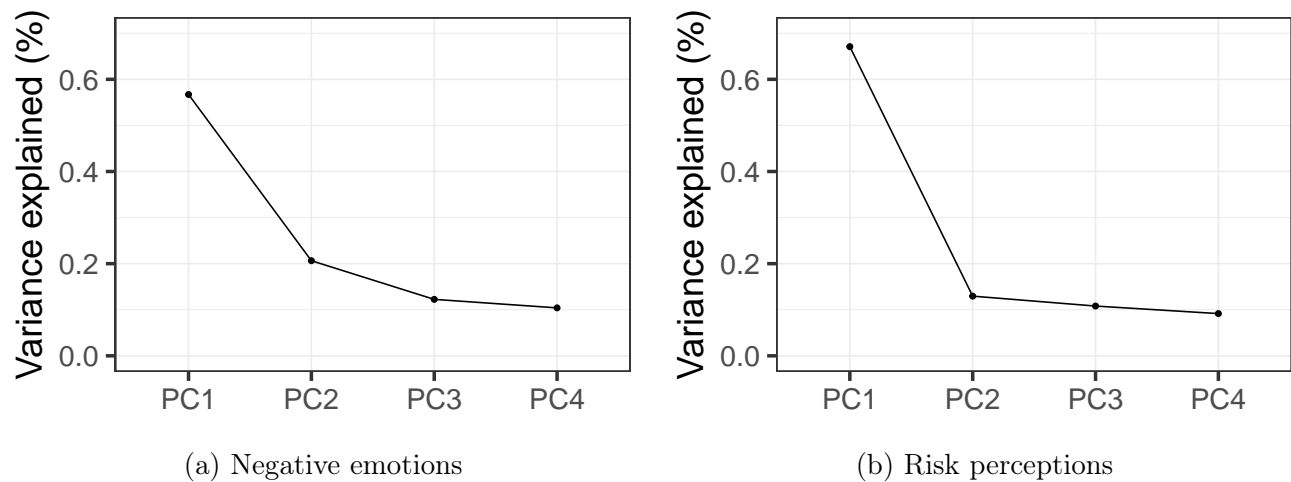


Figure C.1: Scree plots showing the amount of variance explained by each principal component.

D Refugees' list of worries

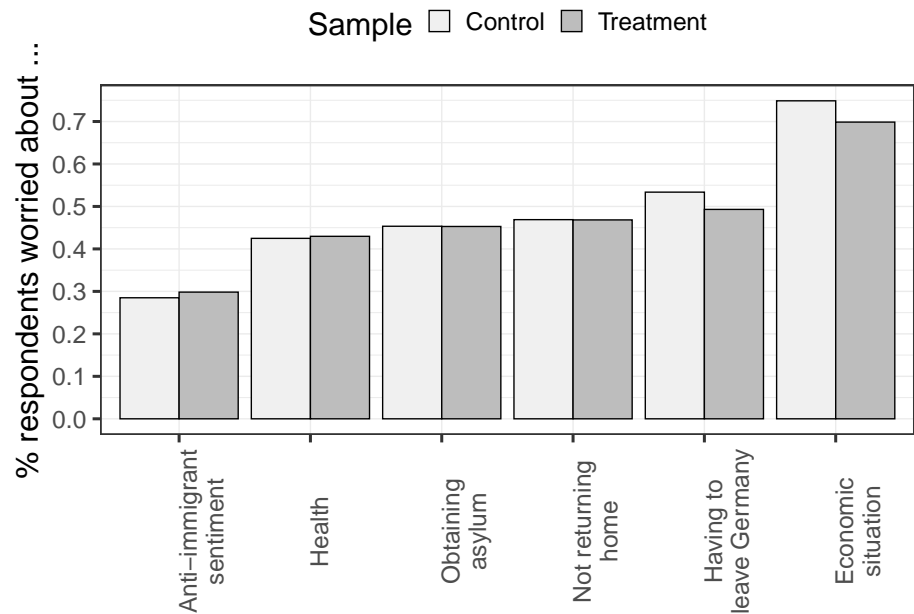


Figure D.1: Set of worries refugees are concerned about, in both treatment and control groups

E The 2016 Munich shooting

On 22 July 2016, an Iranian-German adolescent opened fire near a mall in Munich, killing nine people and wounding thirty-six others. However, unlike with the other cases considered in this analysis, it was more difficult to identify the motivations of the perpetrator in the aftermath of the attack. Journalistic enquiries in the following days revealed that the 18-year-old perpetrator had been a victim of bullying at school and attempted to lure fellow classmates to the site of the shooting (Schmidt, Connolly and Graham-Harrison 2016). Accordingly, officials suspected “revenge” to be the main motive behind the massacre, and registered the attack as a “revenge crime”. However, later reporting also revealed that the perpetrator exhibited xenophobic tendencies and sympathised with right-extremist ideals.¹⁹ Finally, following long deliberation, the Bavarian Police declared in October 2019 that the Munich shooting was being reclassified from a “revenge-” to a “politically motivated crime”, since ‘the radical right-wing and racist views of the perpetrator should not be ignored’ (Deutsche Welle 2019). However, this decision was still far in the future during the period of analysis considered here, so that I do not expect the events in Munich to have had an impact on Germans’ or refugees’ attitudes and well-being.

To examine whether the event radically changed the coefficient estimates, I also run a regression where I differentiate between each treatment week. The Munich shootings occurred on July 22nd, 8 days after the first terrorist attack on July 14th, 2016, so that the “Week 1” dummy conveniently captures the treatment effect prior to the events in Munich. If the Munich shooting affected how Germans’ felt towards refugees and vice versa, responses in the aftermath of the Munich shooting should differ systematically from previous responses. In particular, Germans’ anti-refugee sentiment would be expected to decline in the aftermath of the Munich shooting, given that other xenophobic attacks have temporarily improved natives’ sentiment towards minority groups (e.g. Jakobsson and Blom 2014). As Figures E.1 and E.4 however highlight, treatment coefficient estimates in the first week (i.e. among those who were interviewed prior to the Munich shootings) do not differ substantially and systematically to those in following weeks (i.e. those interviewed after the Munich shootings) across the regression models, increasing my confidence in the assumption that the Munich shootings did not bias the effect estimates.

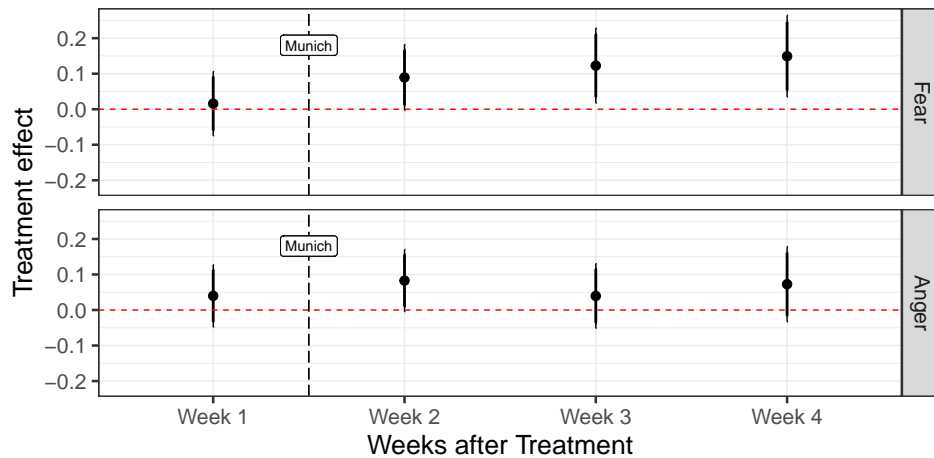


Figure E.1: Treatment effect of the July 2016 terrorist attacks on Germans’ emotions towards refugees, weekly estimates

Figure E.2: Risk assessments

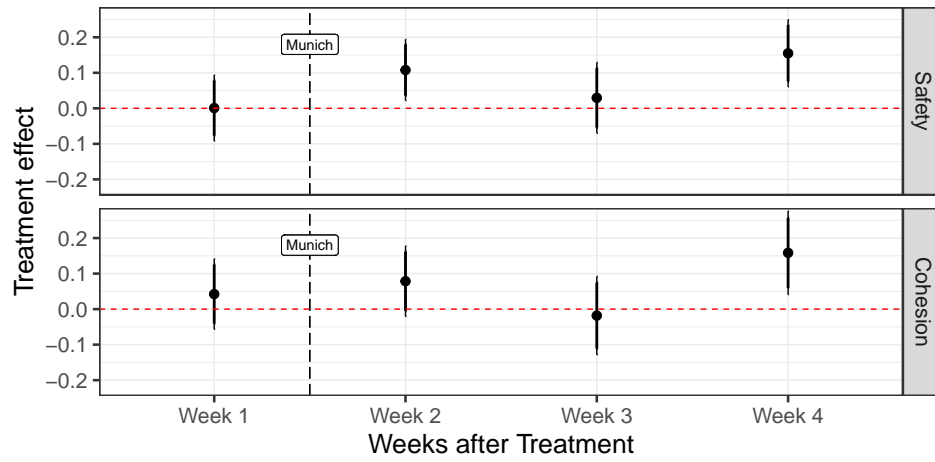


Figure E.3: Treatment effect of the July 2016 terrorist attacks on Germans' risk assessment of refugees, weekly estimates

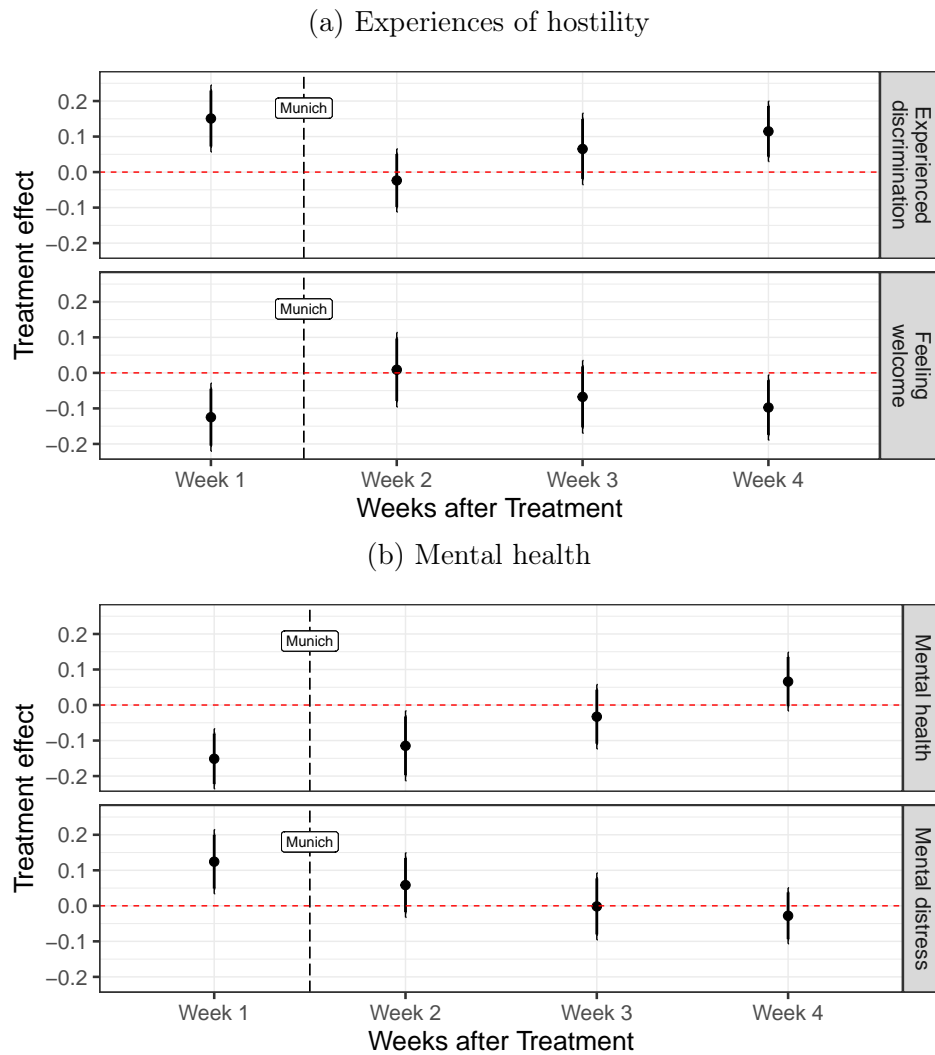


Figure E.4: Treatment effect of the July 2016 terrorist attacks on Refugees' perceived discrimination and mental wellbeing, weekly estimates

F Questionnaire items

Table A.1: Description of used items from the Survey of German citizens (ALLBUS)

Description	Range
Emotions	
<i>What about asylum seekers/Turkish people/Italian people/Jewish people/Polish people living in Germany? To what extent do the following statements apply:</i>	
...I feel sorry for them.	1 (Applies completely) to 4 (Does not apply at all).
...They annoy me.	1 (Applies completely) to 4 (Does not apply at all).
...I find them likeable.	1 (Applies completely) to 4 (Does not apply at all).
...They scare me.	1 (Applies completely) to 4 (Does not apply at all).
Perceived risks	
<i>If you think about the development of German society in the next few years: Do you think that, in the following areas, there will be more opportunities, more risks or neither of these as a result of the refugees?</i>	
...As regards the welfare state.	1 (Considerably more risks) to 5 (Considerably more opportunities).
...As regards public security.	1 (Considerably more risks) to 5 (Considerably more opportunities).
...As regards people living together in society.	1 (Considerably more risks) to 5 (Considerably more opportunities).
...As regards the economic situation in Germany.	1 (Considerably more risks) to 5 (Considerably more opportunities).
Social Distance	
How pleasant or unpleasant would it be to for you to have an asylum seeker/Turkish person/Italian person/Jewish person/Polish person as your neighbour?	1 (Very pleasant) to 7 (Very unpleasant).
How strongly, in your opinion, do asylum seekers/Turkish persons/Italian persons/Jewish persons/Polish persons who live in Germany differ from Germans in their lifestyles?	1 (Not at all) to 7 (Very strongly).

Table A.2: Description of used items from the Survey of Refugees and Asylum Seekers (SOEP)

Description	Range
Hostility	
How often in the last 24 months have you personally experienced being disadvantaged in Germany because of your origin?	1 (Frequently) to 3 (Never)
<i>How often do you worry about...</i>	
...your own economic situation?	1 (A lot) to 3 (Never).
...your health?	1 (A lot) to 3 (Never).

Continued on next page

Table A.2 – *Continued from previous page*

Description	Range
...anti-foreigner sentiment and xenophobia in Germany?	1 (A lot) to 3 (Never).
...the result of your asylum application?	1 (A lot) to 3 (Never).
...being unable to stay in Germany?	1 (A lot) to 3 (Never).
...being unable to return to your country of origin?	1 (A lot) to 3 (Never).
Did you feel welcome in Germany at arrival/now?	1 (Totally) to 5 (Not at all)
PHQ-4: Patient Health Questionnaire	
<i>Over the last two weeks, how often have you been bothered by the following problems?</i>	
...Little interest or pleasure in your activities	0 (Not at all) to 3 (Nearly every day)
...Low spirits, melancholy or hopelessness	0 (Not at all) to 3 (Nearly every day)
...Nervousness, anxiety or tension	0 (Not at all) to 3 (Nearly every day)
...Unable to stop or control worrying	0 (Not at all) to 3 (Nearly every day)
MCS: Mental Health Component Summary	
How would you describe your current state of health?	1 (Very well) to 5 (Poor)
If you have to climb stairs, i.e. walk up several floors: Does your state of health restrict you a lot, a little, or not at all?	1 (A lot) to 3 (Not at all)
And what about other strenuous activities in everyday life, e.g. when you have to lift something heavy or need to be mobile: Does your state of health restrict you a lot, a little or not at all?	1 (A lot) to 3 (Not at all)
<i>How often in the last four weeks...</i>	
...did you feel in low spirits and melancholy?	1 (Very often) to 5 (Never)
...did you feel full of energy?	1 (Very often) to 5 (Never)
...did you feel full of energy?	1 (Very often) to 5 (Never)
...did you suffer from severe physical pain?	1 (Very often) to 5 (Never)
..., due to health problems of a physical nature, did you achieve less in your work or everyday activities than you actually intended?	1 (Very often) to 5 (Never)
..., due to health problems of a physical nature, have you been restricted in the type of tasks you can perform in your work or everyday activities?	1 (Very often) to 5 (Never)
..., due to psychological or emotional problems, did you achieve less in your work or everyday activities than you actually intended?	1 (Very often) to 5 (Never)
..., due to psychological problems or emotional problems, did you perform your work or everyday activities less carefully than usual?	1 (Very often) to 5 (Never)
..., due to health or psychological problems, have you been restricted in terms of your social contact to for example friends, acquaintances or relatives?	1 (Very often) to 5 (Never)

G Full tables

Table A.3: Impact of July attacks on feelings towards asylum seekers

	Factor	Fear	Anger	Pity	Affection
Treatment	0.08** (0.03)	0.09*** (0.03)	0.06** (0.03)	-0.01 (0.03)	-0.07** (0.03)
Female	-0.03 (0.03)	0.08*** (0.03)	-0.02 (0.03)	0.06** (0.03)	0.10*** (0.03)
Age	0.04 (0.04)	-0.00 (0.04)	0.01 (0.03)	-0.04 (0.03)	-0.12*** (0.04)
East	0.17*** (0.03)	0.03 (0.03)	0.12*** (0.03)	-0.13*** (0.03)	-0.17*** (0.03)
Int. contacts	-0.01 (0.03)	-0.00 (0.03)	-0.03 (0.03)	0.00 (0.03)	0.03 (0.03)
Tertiary	-0.20*** (0.03)	-0.13*** (0.03)	-0.16*** (0.03)	0.10*** (0.03)	0.13*** (0.03)
Married	0.00 (0.03)	0.05 (0.03)	-0.02 (0.03)	0.03 (0.03)	-0.01 (0.03)
Unemployed	0.01 (0.04)	0.05 (0.04)	0.01 (0.03)	0.01 (0.03)	0.03 (0.04)
Adj. R ²	0.06	0.03	0.05	0.03	0.06
Num. obs.	959	959	959	959	959

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Table A.4: Impact of July attacks on risks associated with asylum seekers

	Factor	Safety	Cohesion	Welfare State	Economy
Treatment	0.05 (0.03)	0.06** (0.03)	0.07** (0.03)	0.03 (0.03)	0.04 (0.03)
Female	-0.01 (0.03)	0.01 (0.03)	-0.01 (0.03)	0.00 (0.03)	0.05 (0.03)
Age	0.13*** (0.04)	0.08** (0.04)	0.05 (0.04)	0.08* (0.04)	0.10** (0.04)
East	0.08** (0.03)	0.06* (0.03)	0.08** (0.03)	0.04 (0.03)	0.02 (0.03)
Int. contacts	-0.02 (0.03)	0.00 (0.03)	-0.02 (0.03)	-0.01 (0.03)	-0.00 (0.03)
Tertiary	-0.13*** (0.03)	-0.09*** (0.03)	-0.04 (0.03)	-0.05 (0.03)	-0.15*** (0.03)
Married	0.02 (0.03)	0.02 (0.03)	-0.01 (0.04)	0.07** (0.03)	-0.05 (0.03)
Unemployed	-0.01 (0.04)	-0.03 (0.04)	-0.00 (0.04)	-0.01 (0.04)	-0.02 (0.04)
Adj. R ²	0.03	0.01	0.00	0.01	0.03
Num. obs.	959	959	959	959	959

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Table A.5: Impact of July attacks on perceived social distance

	Refugee as Neighbour	Difference to Germans
Treatment	0.04 (0.03)	-0.00 (0.03)
Female	-0.06** (0.03)	0.02 (0.03)
Age	0.10** (0.04)	0.16*** (0.04)
East	0.16*** (0.03)	0.18*** (0.03)
Int. contacts	0.03 (0.03)	0.07** (0.03)
Tertiary	-0.17*** (0.03)	-0.05 (0.03)
Married	0.04 (0.03)	0.00 (0.03)
Unemployed	0.02 (0.04)	0.01 (0.04)
Adj. R ²	0.06	0.06
Num. obs.	959	959

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Table A.6: Impact of July attacks on refugees' experience of hostility and wellbeing

	Discrimination	Anti-immig. worries	Feeling welcome	Mental distress	Mental health
Treatment	0.08** (0.03)	0.02 (0.03)	-0.06* (0.03)	0.04 (0.03)	-0.05* (0.03)
Refugee	-0.04 (0.03)	-0.02 (0.03)	-0.01 (0.03)	-0.06* (0.03)	0.05 (0.03)
Syrian	-0.02 (0.04)	-0.16*** (0.04)	-0.13*** (0.04)	0.02 (0.04)	-0.03 (0.04)
Iraqi	-0.05 (0.06)	-0.15*** (0.05)	-0.02 (0.06)	-0.02 (0.06)	0.06 (0.05)
Afghan	-0.01 (0.06)	-0.03 (0.06)	0.11* (0.06)	0.05 (0.06)	-0.08 (0.05)
Comm. accom.	0.04 (0.03)	-0.03 (0.03)	-0.07* (0.04)	0.17*** (0.03)	-0.10*** (0.03)
Female	-0.04 (0.03)	-0.04 (0.03)	0.04 (0.04)	0.07** (0.03)	-0.12*** (0.03)
Age	-0.10*** (0.03)	-0.04 (0.03)	0.03 (0.03)	0.17*** (0.03)	-0.13*** (0.03)
East	0.05 (0.04)	0.01 (0.04)	0.03 (0.04)	0.03 (0.04)	0.03 (0.04)
Int. contacts	-0.00 (0.03)	-0.02 (0.03)	-0.01 (0.03)	0.01 (0.03)	0.04 (0.03)
Adj. R ²	0.02	0.02	0.02	0.05	0.04
Num. obs.	1033	1033	1033	1033	1033

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

H Changes in Germans' attitudes towards all minority groups

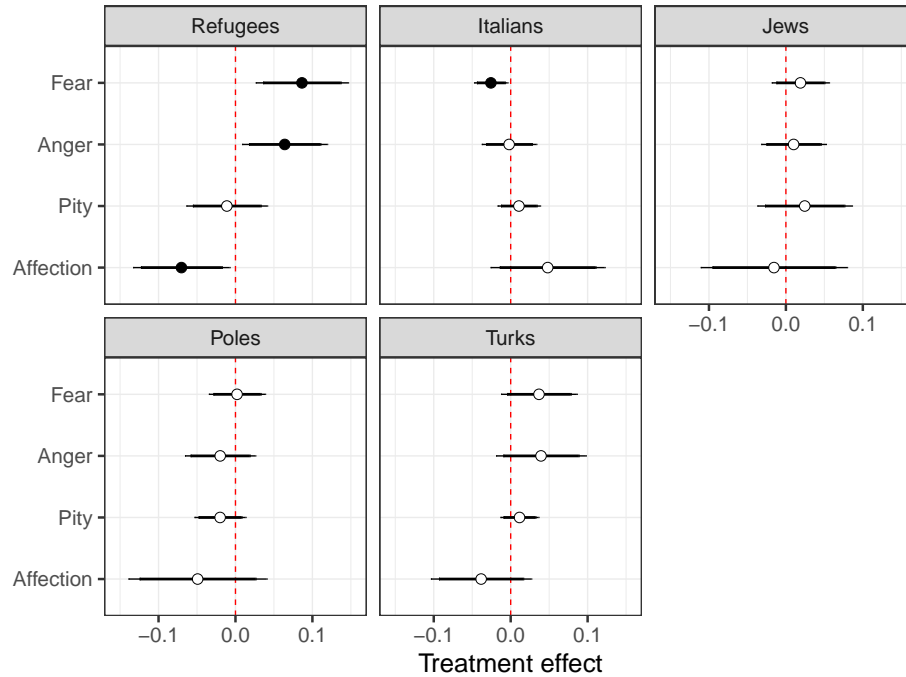


Figure H.1: Treatment effect of the July 2016 terrorist attacks on respondents' emotions towards different immigrant and minority groups: Refugees, Italians, Poles, Turks, and Jews

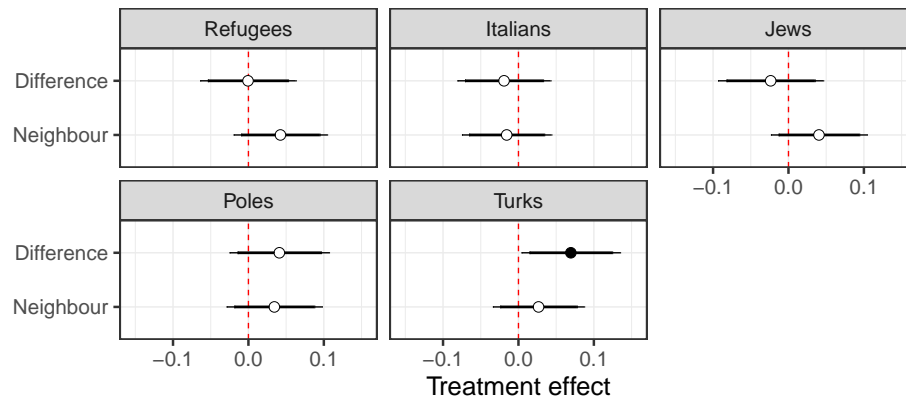


Figure H.2: Treatment effect of the July 2016 terrorist attacks on respondents' perceived social distance between Germans and different immigrant and minority groups: Asylum Seekers, Italians, Poles, Turks, and Jews.

I Entropy balance

Entropy balancing directly balances control and treatment groups on observed covariates, using maximum entropy weights. The goal with entropy balancing, as with all preprocessing of the data prior to the estimation of causal effects, is to adjust the covariate distribution in the control group by reweighing observations in such a way as that it becomes similar to the covariate distribution of the treatment group. In entropy balancing, groups are balanced directly on observed covariates, and may be balanced on higher moments of the data. This approach estimates the counterfactual in the following way:

$$E[Y(0) \mid T = 1] = \frac{\sum_{\{i|T=0\}} Y_i w_i}{\sum_{\{i|T=0\}} w_i}, \quad (1)$$

where w_i is the entropy balancing weight chosen to minimise the entropy distance metric, $\log(w_i/q_i)$:

$$\min_{w_i} H(w) = \sum_{\{i|T=0\}} w_i \log(w_i/q_i), \quad (2)$$

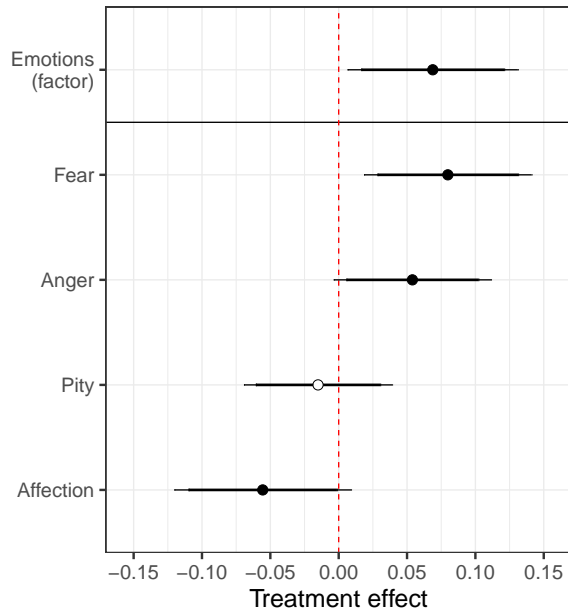
with $q_i = 1/n_0$ denoting a base weight, and implemented conditional on a set of balancing constraints:

$$\sum_{\{i|T=0\}} w_i c_{ri}(\mathbf{X}_i) = m_r, \quad r \in 1, \dots, R \quad (3)$$

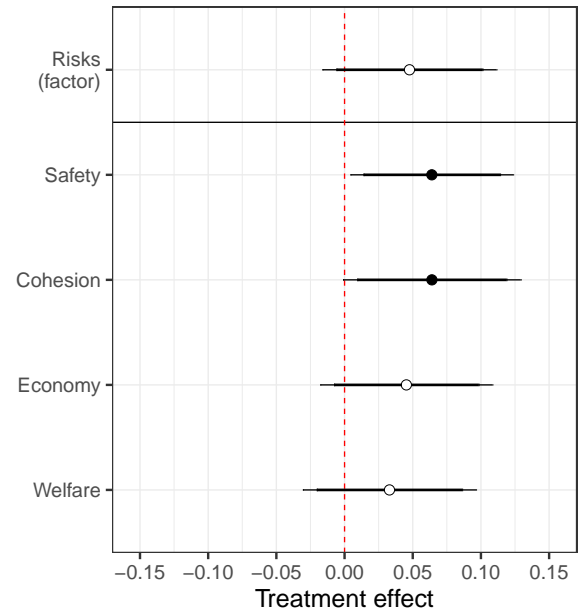
$$\sum_{\{i|T=0\}} w_i = 1, \text{ and} \quad (4)$$

$$w_i \geq 0 \text{ for all } w_i \text{ so that } D = 0 \quad (5)$$

In practice, entropy balancing can be understood as a generalisation of the weighting approach in propensity score models, but directly adjusts the weights to the known sample moments (Hainmueller 2012: 31). All results below rely on this approach, and use a sample that was reweighted using entropy balancing where treatment and control groups were balanced on the first (mean), second (variance) and third (skewness) moment conditions of each covariate. The variable measuring the number of prior interview attempts was left out of the balancing process. This was done because of the considerable differences between control and treatment groups, which may result in control group weights for this variable that are unrealistic and thus would severely distort the estimated results. Following the advice of Muñoz, Falcó-Gimeno and Hernández (2019), this variable is excluded from the re-balancing process.

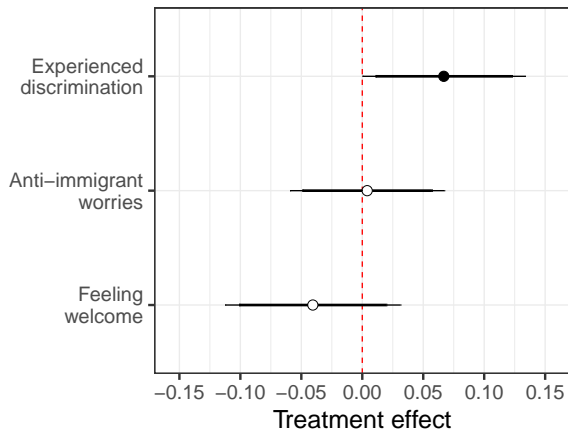


(a) Emotions towards asylum seekers

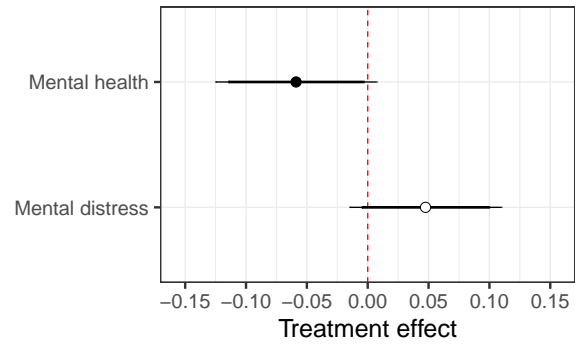


(b) Risks associated with asylum seekers

Figure I.1: Impact of the July 2016 terror attacks on feelings toward refugees and risk perceptions, entropy balanced sample.



(a) Impact on refugee sentiment

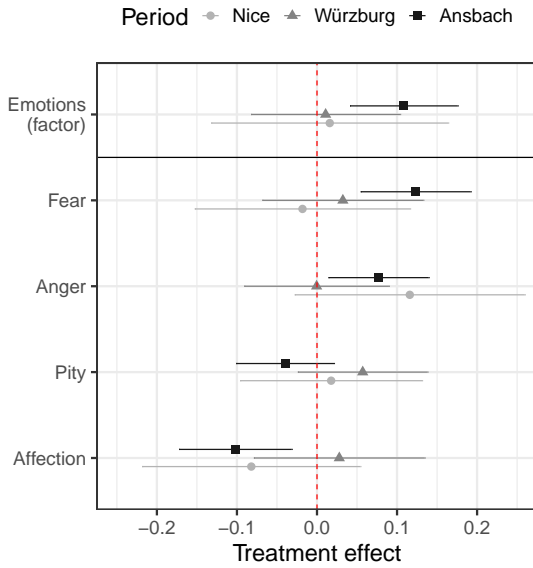


(b) Impact on refugee well-being

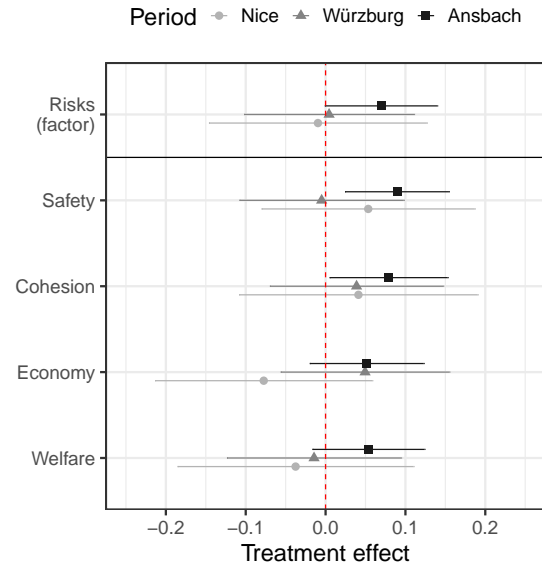
Figure I.2: Impact of the July 2016 terrorist attacks on (a) refugee sentiment and (b) well-being, entropy balanced sample.

J Treatment intensity

In the estimations below, I disaggregate the treatment effect to identify the exposure to each individual event. Accordingly, the coefficient for Nice displays the effect for all respondents who were interviewed after the terrorist attacks in Nice, but before the attacks in Würzburg and Ansbach and so on. Given the close proximity within which all three events occurred, only few respondents are exposed to one or two but not all three attacks. For the German (Refugee) sample, 48 (75) respondents were interviewed after Nice but before Würzburg and Ansbach, and 98 (125) after Würzburg but before Ansbach. This considerably reduces the statistical power of the estimates. Still, results are qualitatively similar with coefficient estimates pointing in a similar direction.

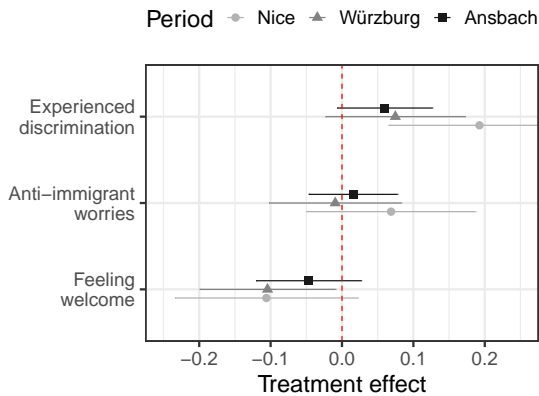


(a) Emotions towards asylum seekers

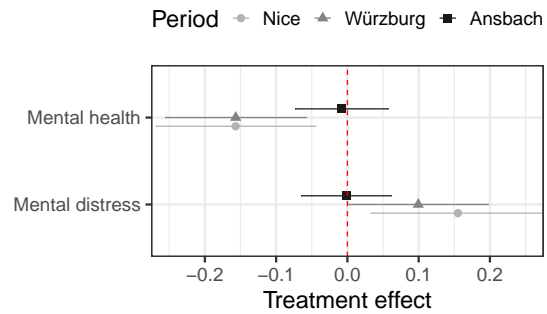


(b) Risks associated with asylum seekers

Figure J.1: Impact of the July 2016 terrorist attacks on feelings toward refugees and risk perceptions, accounting for the effect of each terrorist attack.



(a) Impact on refugee sentiment

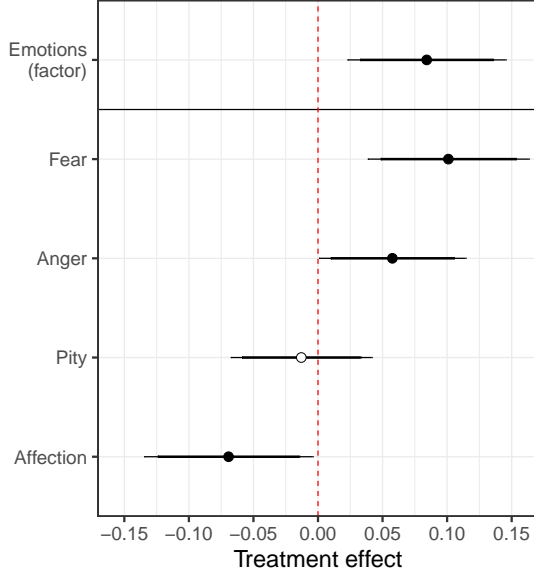


(b) Impact on refugee well-being

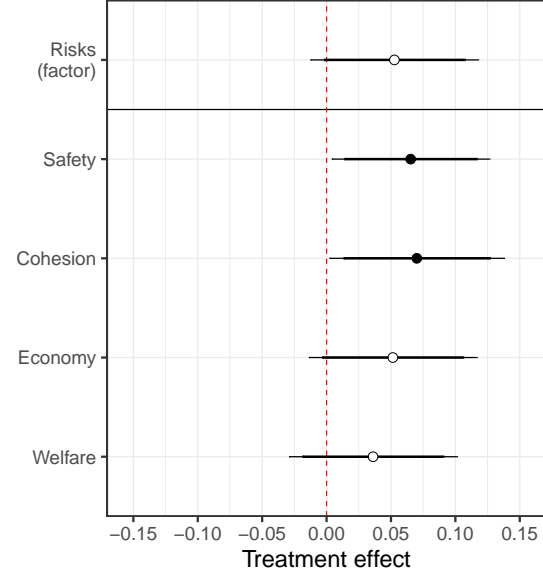
Figure J.2: Impact of the July 2016 terrorist attacks on (a) refugee sentiment and (b) well-being, accounting for the effect of each terrorist attack.

K Excluding Nice

Contrary to the events in Ansbach and Würzburg, the attack in Nice occurred outside of Germany and was not perpetrated by refugee, but instead by a Tunisian citizen who had been living in France for a number of years. It was also by far the biggest event, resulting in 86 fatalities. To see whether natives' and refugees' reactions to the attacks in Nice differed systematically from reactions to the attacks in Germany, I exclude all respondents who were exposed to the terrorist attacks in Nice, but not to any of the two domestic attacks in Germany in Figures K.1 and K.2.

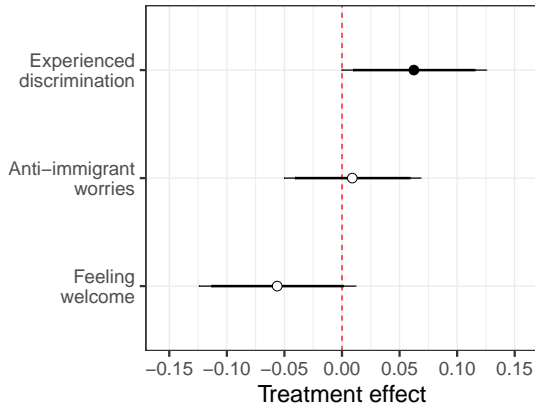


(a) Emotions towards asylum seekers

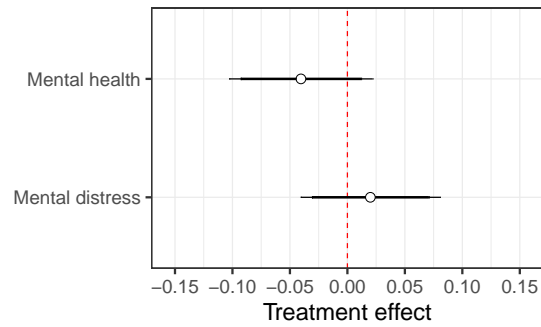


(b) Risks associated with asylum seekers

Figure K.1: Impact of the July 2016 terrorist attacks on feelings toward refugees and risk perceptions, excluding Nice.



(a) Impact on refugee sentiment

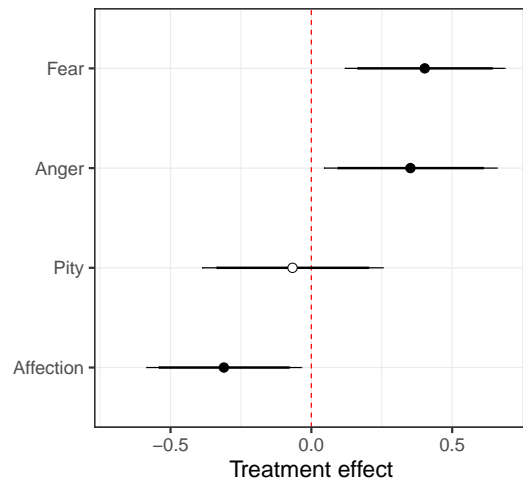


(b) Impact on refugee well-being

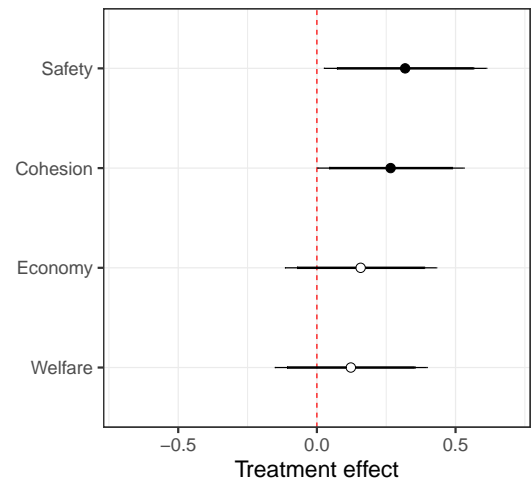
Figure K.2: Impact of the July 2016 terrorist attacks on (a) refugee sentiment and (b) well-being, excluding Nice.

L Logistic regression

The estimations below rely on logistic regression analyses to estimate the treatment effect on binary dependent variables.



(a) Emotions towards asylum seekers



(b) Risks associated with asylum seekers

Figure L.1: Impact of the July 2016 terrorist attacks on feelings toward refugees and risk perceptions, logistic regression.

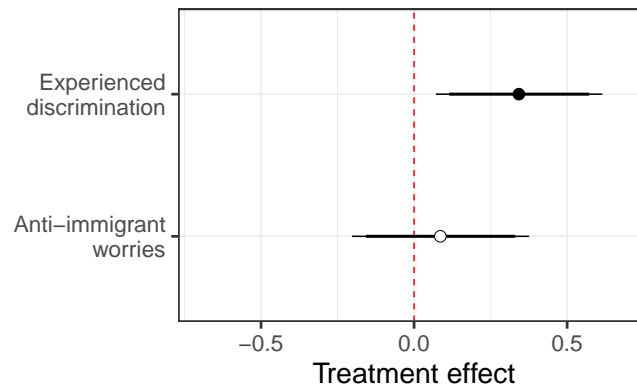


Figure L.2: Impact of the July 2016 terrorist attacks on refugee sentiment, logistic regression.

M Missingness

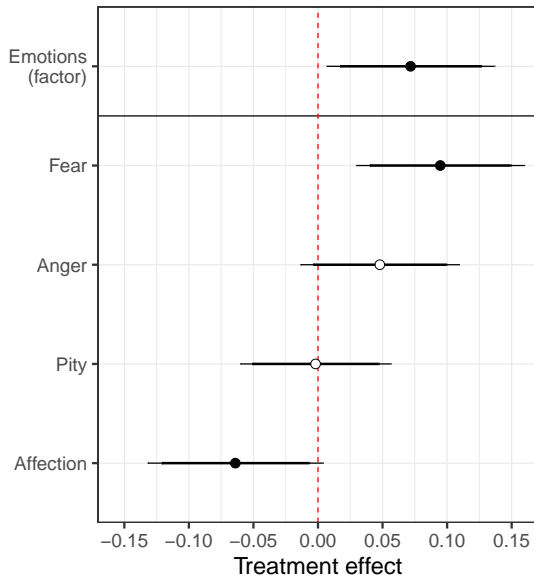
Tables A.7 and A.8 detail the number and share of missing values across each variable for the German and Refugee samples. Missingness differs considerably across variables, and is greatest for the dependent variables measuring German respondents' affection towards refugees (13%) as well as refugee respondents' wellbeing (12%), but considerably lower for all other variables. Given the analyses of multiple outcome variables and the considerable differences in missingness, I rely on multiple imputation to preserve the maximum number of observations across all models. Alternatively, in the specifications below, I re-estimate all results using list-wise deletion by model group.

Table A.7: Missing values (German sample)

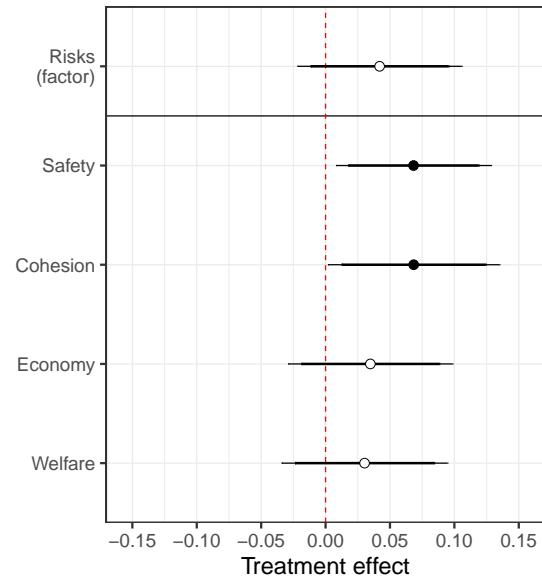
	Freq.	Prop.
Emotions		
Anger	16	0.02
Fear	20	0.02
Pity	13	0.01
Affection	129	0.13
Risk		
Welfare state	11	0.01
Social cohesion	11	0.01
Safety	9	0.01
Economy	14	0.01
Social distance		
Cultural difference	37	0.04
Neighbour	18	0.02
Independent variables		
Female	0	0.00
Age	0	0.00
East	0	0.00
Int. contacts	0	0.00
Tertiary	4	0.00
Married	1	0.00
Not working	0	0.00

Table A.8: Missing values (Refugee sample)

	Freq.	Prop.
Hostility		
Discrimination	0	0.00
Anti-immig. worries	0	0.00
Feeling welcome	43	0.04
Well-being		
Mental health	122	0.12
Mental distress	121	0.12
Independent variables		
Female	0	0.00
Age	0	0.00
East	0	0.00
Int. contacts	0	0.00
Refugee	25	0.02
Syrian	0	0.00
Iraqi	0	0.00
Afghan	0	0.00
Comm. accom.	0	0.00

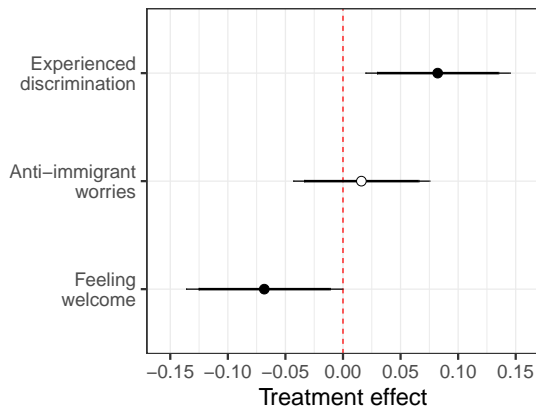


(a) Emotions towards asylum seekers

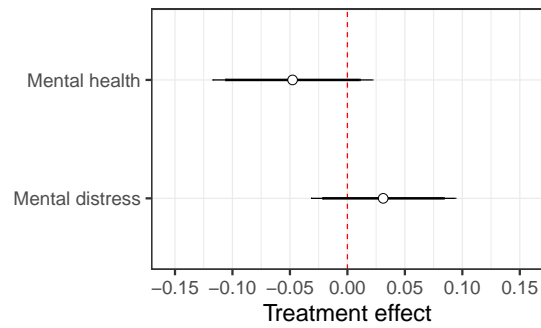


(b) Risks associated with asylum seekers

Figure M.1: Impact of the July 2016 terrorist attacks in on feelings toward refugees and risk perceptions, list-wise deletion of missing values.



(a) Impact on refugee sentiment

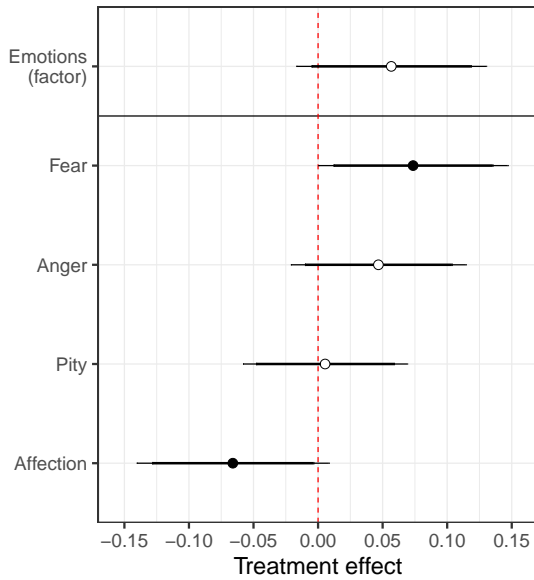


(b) Impact on refugee well-being

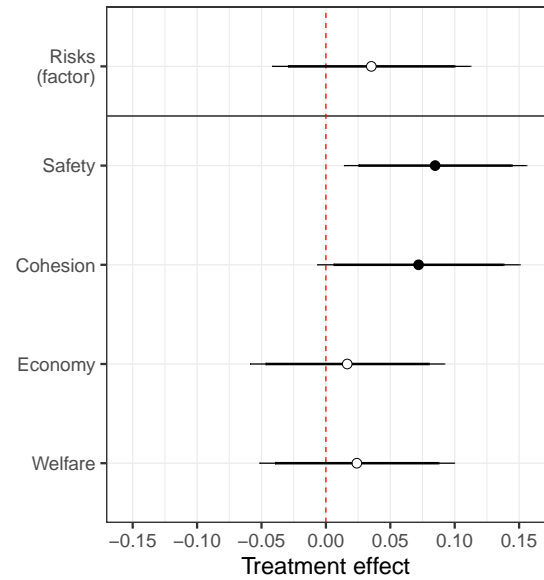
Figure M.2: Impact of the July 2016 terrorist attacks on (a) refugee sentiment and (b) well-being, list-wise deletion of missing values.

N Reachability

In the analyses below, I only include those respondents where an interview occurred after 1, 2, or at most 3 contact attempts.

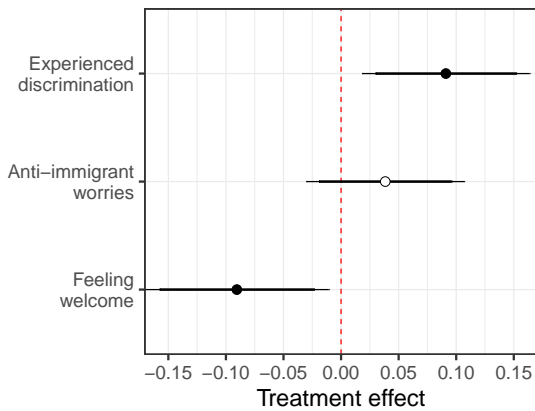


(a) Emotions towards asylum seekers

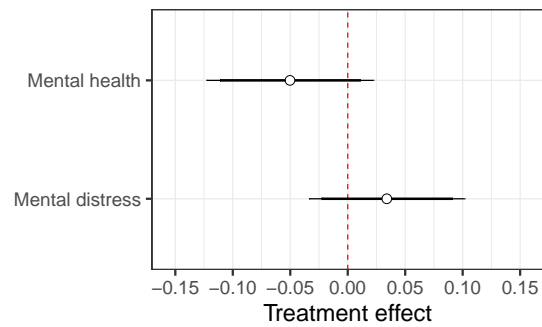


(b) Risks associated with asylum seekers

Figure N.1: Impact of the July 2016 terrorist attacks on feelings toward refugees and risk perceptions, accounting for differences in reachability.



(a) Impact on refugee sentiment



(b) Impact on refugee well-being

Figure N.2: Impact of the July 2016 terrorist attacks on (a) refugee sentiment and (b) well-being, accounting for differences in reachability.

O Specification curve

Thus far, I have scrutinised the stability of our results to specific model adjustments. A more exhaustive way to assess the robustness of the estimates is to run all possible specifications that arise from a combination of analytical choices, using a specification curve analysis (Simonsohn, Simmons and Nelson 2020). The Figures O.1 and O.2 display how the estimated treatment effect varies across all combination of all control variables used. In total, Figure O.1 displays the coefficients of 128 separately-estimated models, and Figure O.2 the coefficients of 512 separate models. Effect sizes are ordered by magnitude, and are strongly consistent across model specifications.

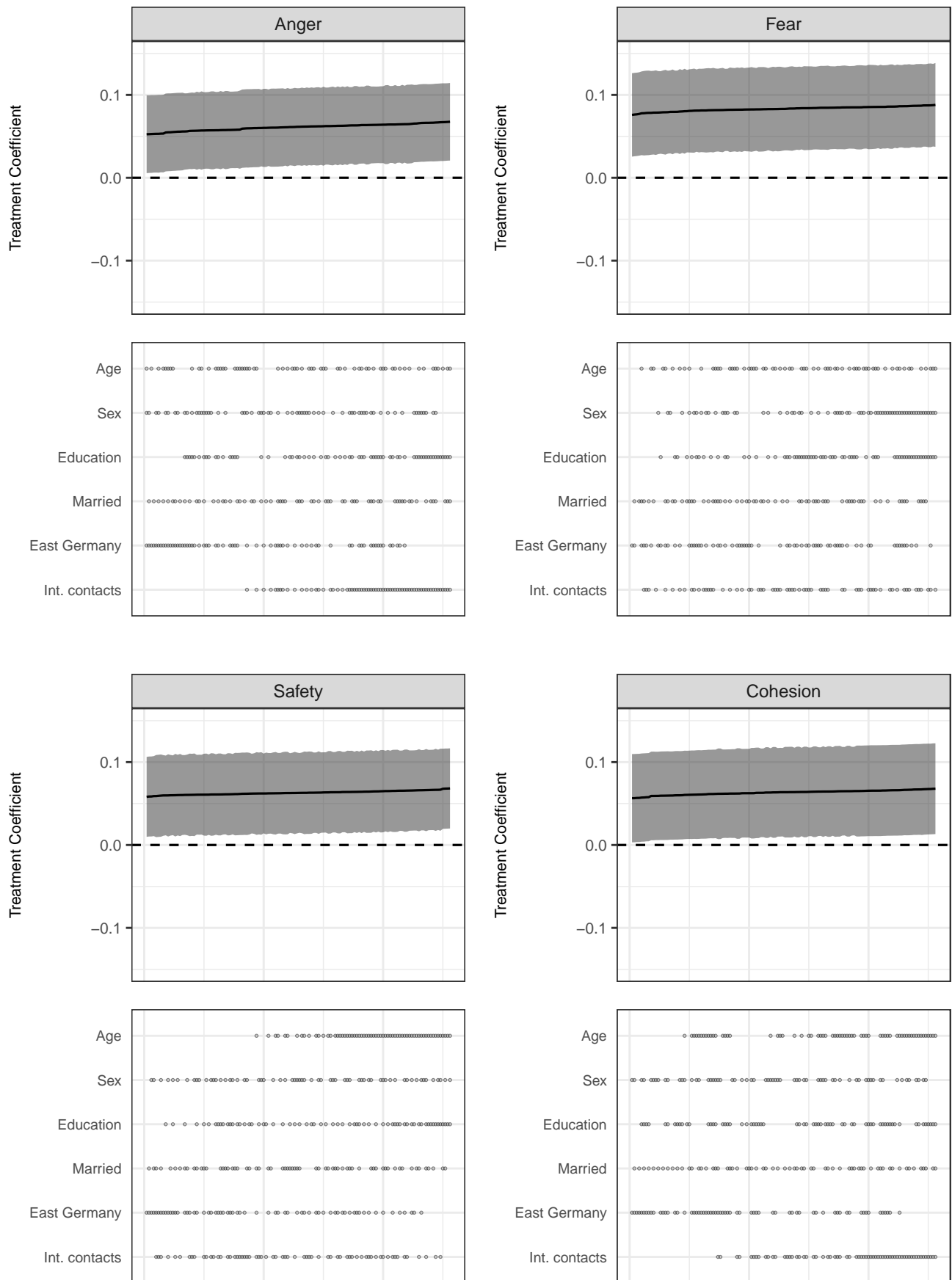


Figure O.1: Specification plots, German sample

Notes: The plots below show the estimated coefficients across a large number of model specifications. Dots indicate the inclusion of a modelling choice into the specification. Specifications are ordered by effect size magnitude (with 90% CI).

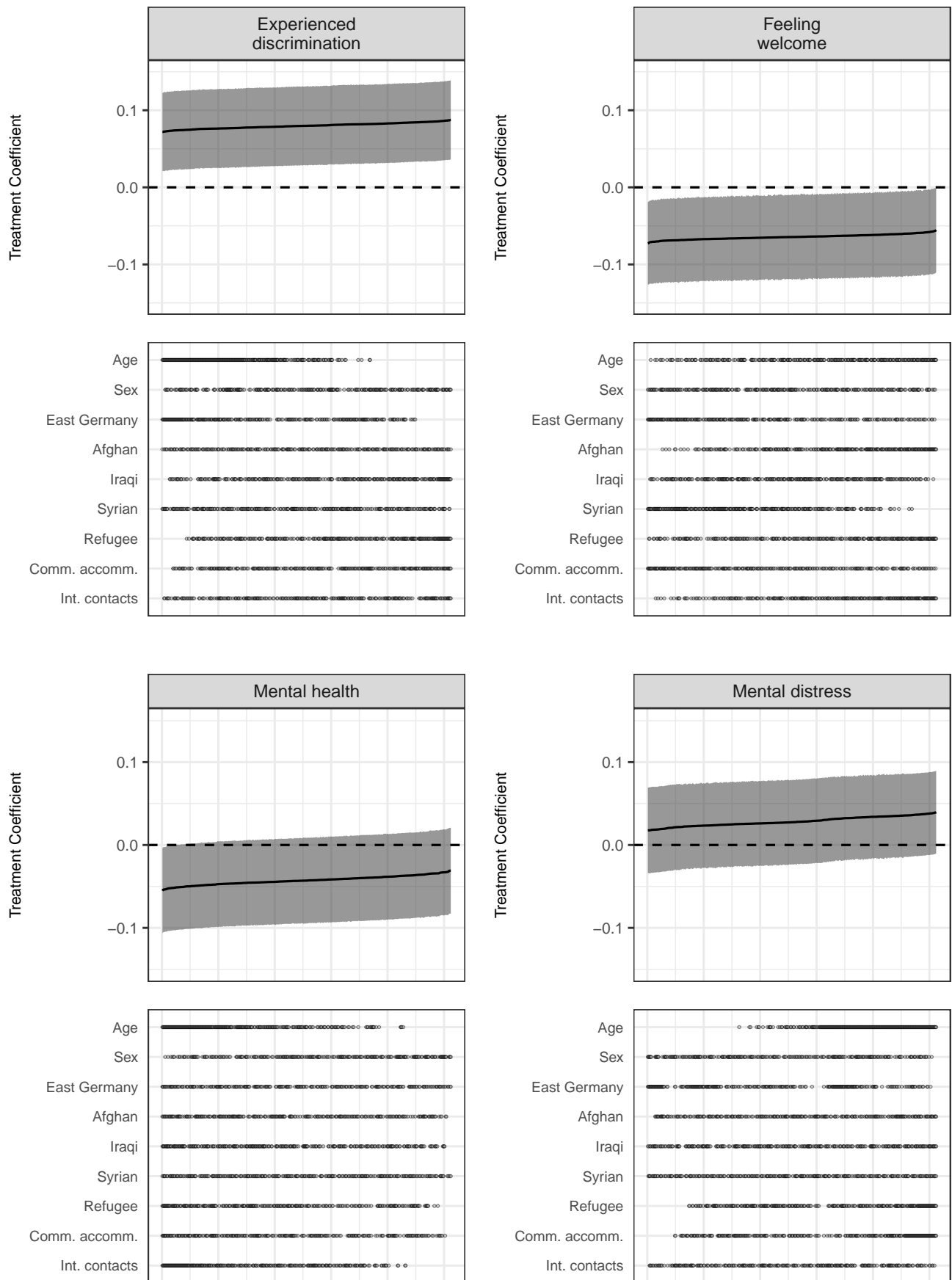


Figure O.2: Specification plots, Refugee sample

Notes: The plots below show the estimated coefficients across a large number of model specifications. Dots indicate the inclusion of a modelling choice into the specification. Specifications are ordered by effect size magnitude (with 90% CI).

P Varying bandwidths

The estimations below are run at two different temporal bandwidths: 21 and 35 days (or 3 and 5 weeks, respectively) before and after the first attack in Nice on July 14th, 2016. All estimations are derived through OLS with heteroskedasticity-robust standard errors.

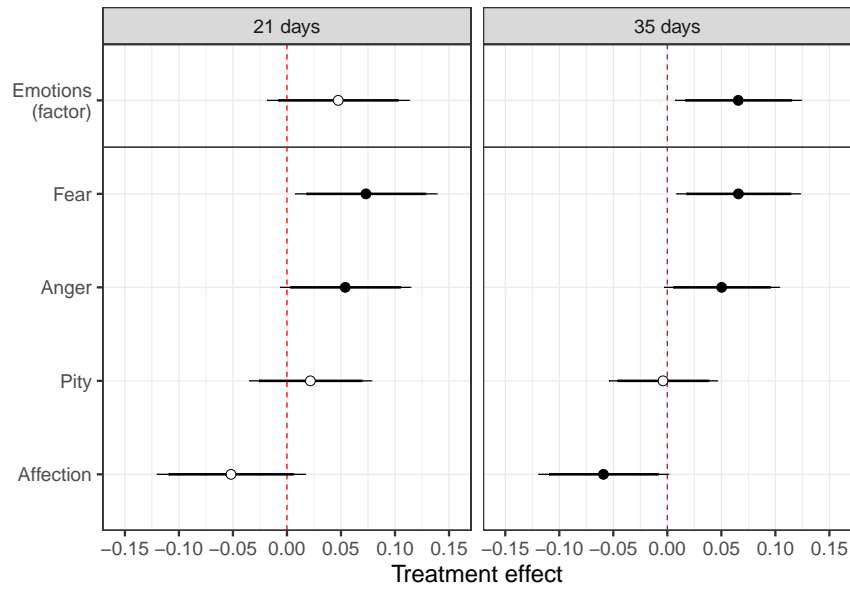


Figure P.1: Impact of the July 2016 terror attacks on feelings toward refugees, varying bandwidths.

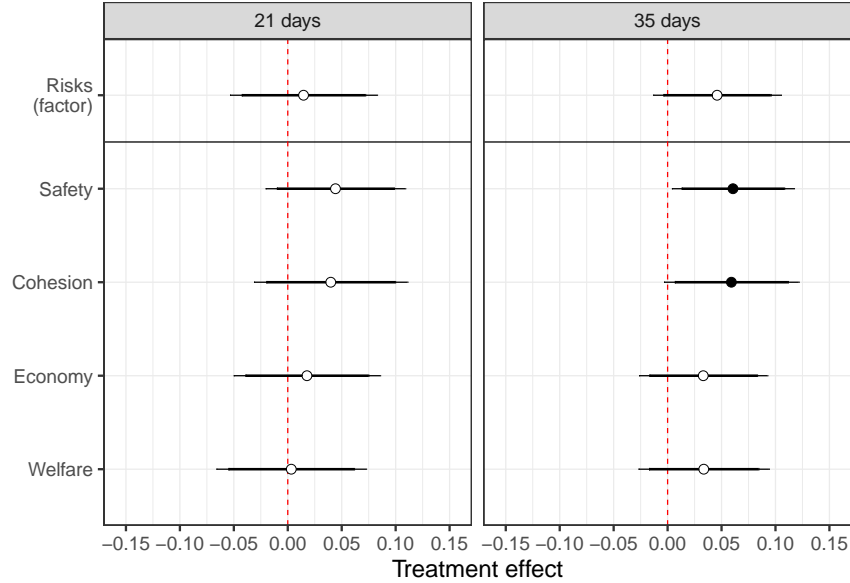


Figure P.2: Impact of the July 2016 terror attacks on risk perceptions towards refugees, varying bandwidths.

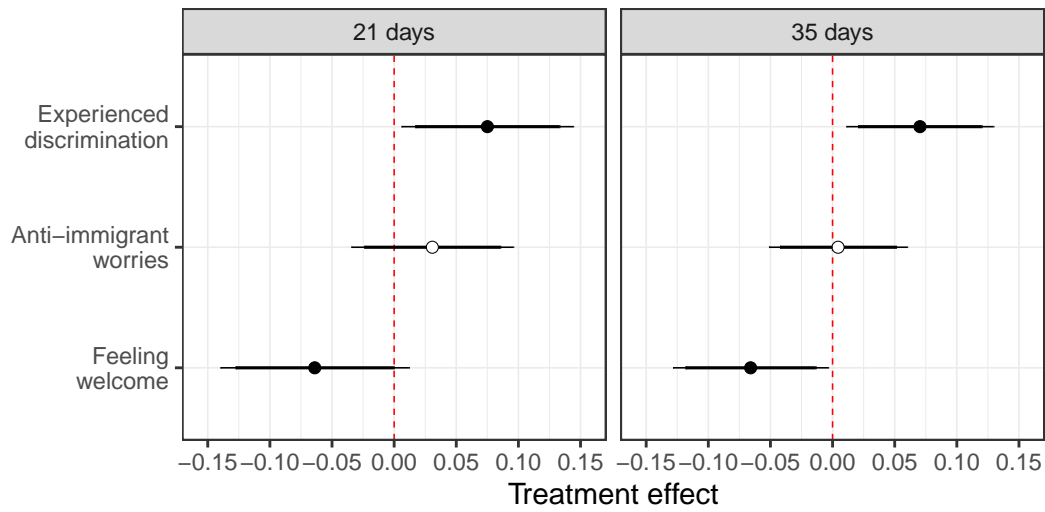


Figure P.3: Impact of the July 2016 terrorist attacks on refugee sentiment, varying bandwidths.

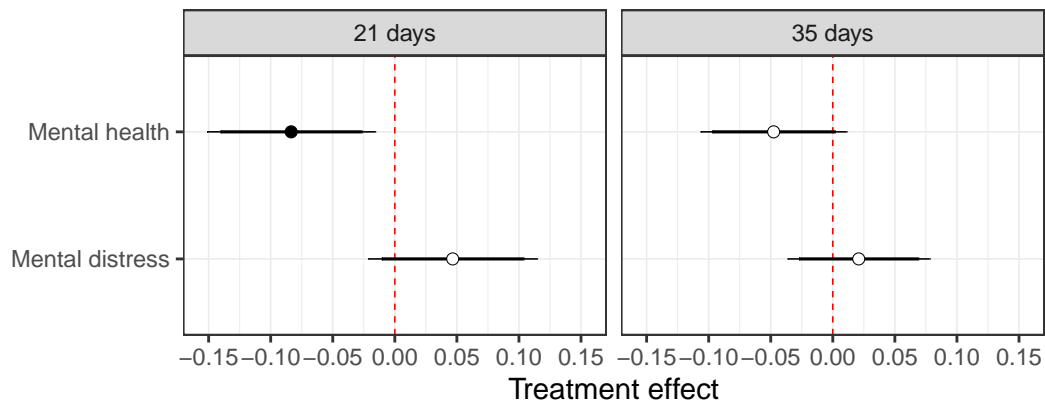


Figure P.4: Impact of the July 2016 terrorist attacks on refugees' mental wellbeing, varying bandwidths.

Q Placebo analysis

Figures Q.1 and Q.2 compare the estimated coefficients from the placebo treatments in the period prior to the first terrorist attack (grey bars) to the estimated treatment effect reported in the results section (red line). As can be seen, the estimated coefficients from the main analysis are all consistently larger than the placebo effects (except for the coefficient for pity), with placebo estimates tending to cluster around zero.

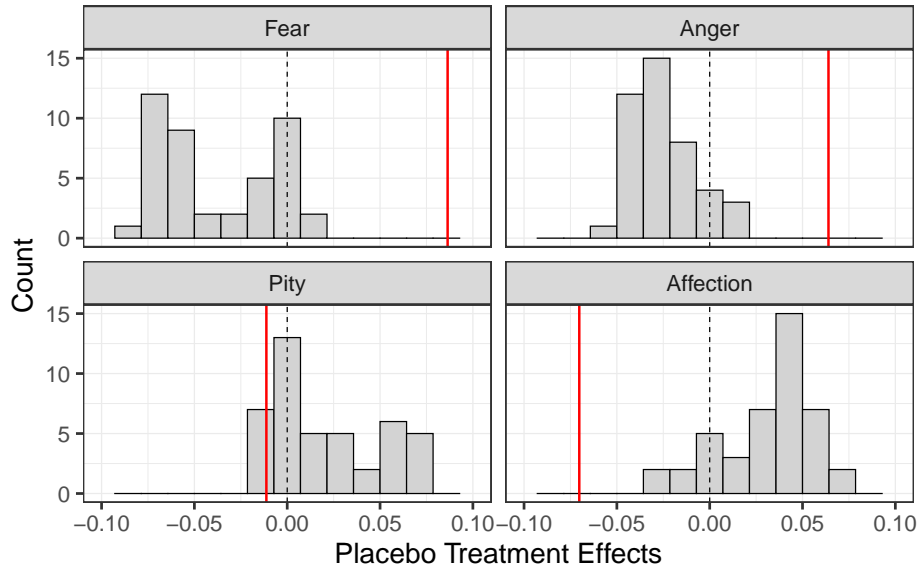


Figure Q.1: Comparing placebo estimates to reported effect of terrorist attacks on Germans' negative emotions towards refugees

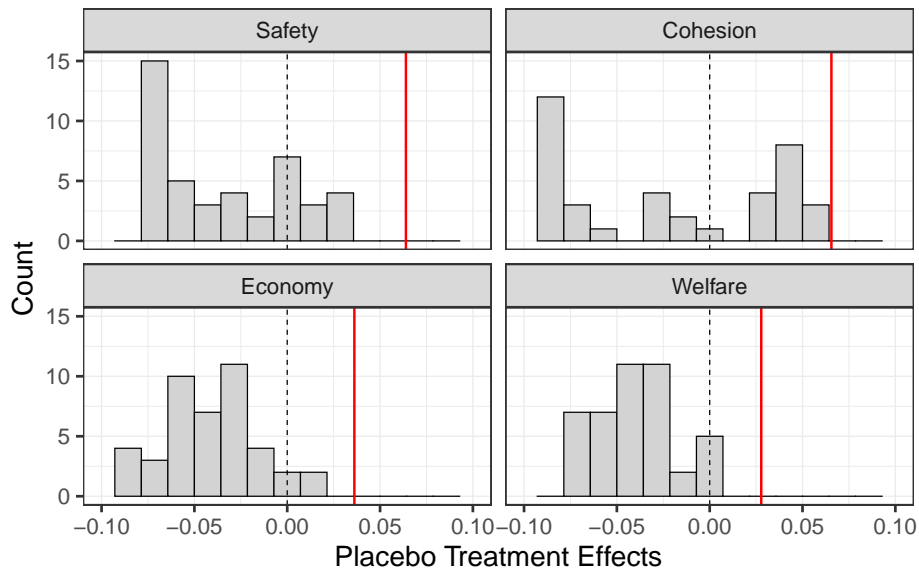


Figure Q.2: Comparing placebo estimates to reported effect of terrorist attacks on Germans' risk assessments of refugees

R 2016 Brexit referendum

On June 23rd, 2016, the UK voted to leave the European Union, with immigration having played a considerable role in the decision (Goodwin and Milazzo 2017). In Figure R.1 I examine whether the Brexit referendum may have temporarily improved Germans' attitudes towards refugee and asylum immigration, but results show that it had no tangible effect on how Germans felt towards refugees.

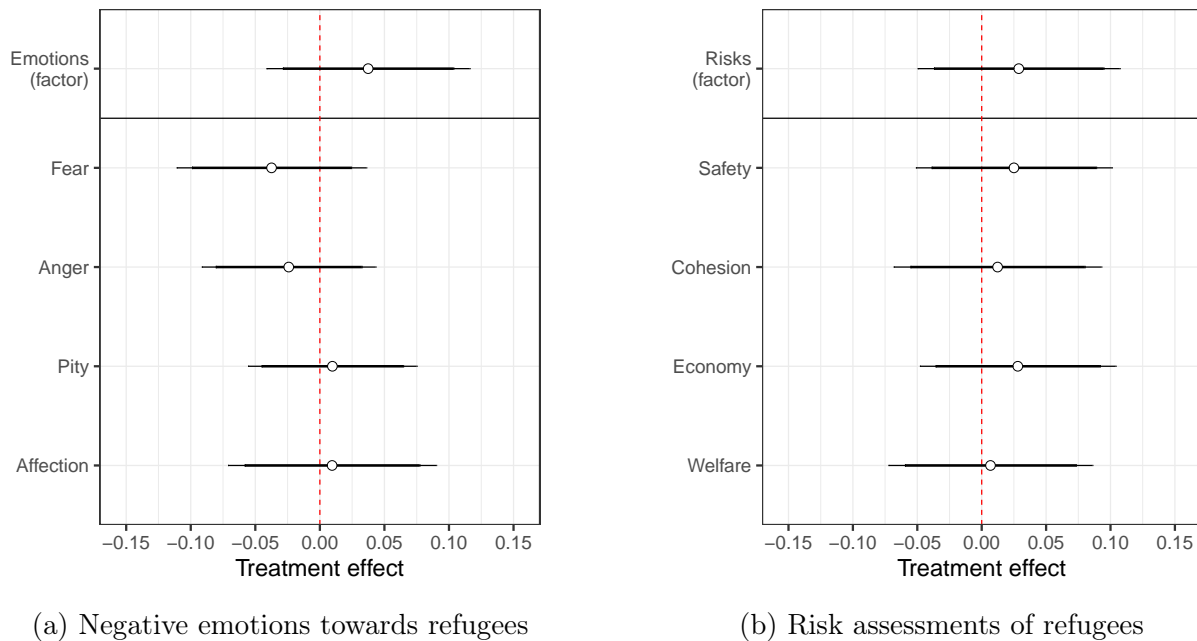


Figure R.1: Impact of the 2016 Brexit referendum on feelings toward and risk assessments of refugees.

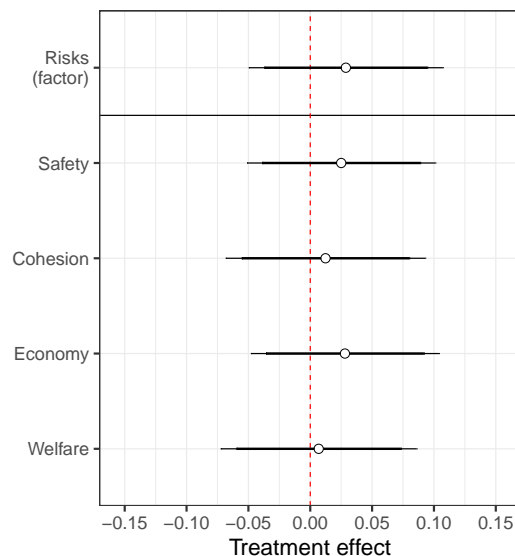


Figure R.2: Impact of the 2016 Brexit referendum on risk perceptions towards refugees.

S Sense of solidarity and national pride

In addition to questions about their sentiment towards refugees and asylum seekers, German respondents were asked how connected they felt towards others in their country, towards the European Union and its residents, and how proud they felt to be German. I use responses to these questions to assess whether Germans' sense of solidarity and national pride was affected by the terrorist attacks.

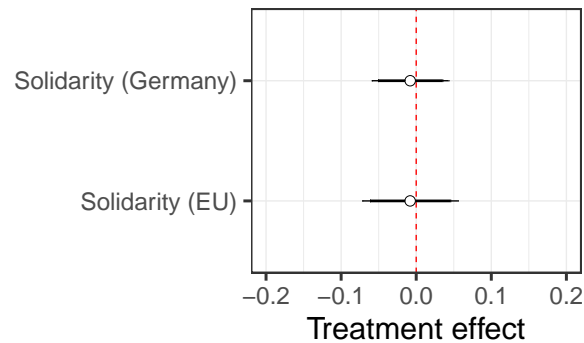


Figure S.1: Impact of the July 2016 terrorist attacks on Germans' sense of solidarity and national pride.

T Attitudes towards refugee immigration

A subset of respondents in the German sample was asked whether they were in favour of continuing to admit, limit, or restrict the immigration of asylum seekers fleeing war, political persecution, or dire economic circumstances. I recode this three-way categorical variable into a binary variable that measures some or strong opposition to the immigration of asylum seekers. Results in Figure T.1 suggest that respondents were more likely to oppose the immigration of refugees following the terrorist attacks, regardless of whether refugees were believed to be escaping war, political persecution, or economic circumstances. In fact, the point estimate is most pronounced for refugees fleeing war, at around 11 percentage points. Given that in the control group, the overwhelming majority of respondents were already opposed to the arrival of economic migrants (93%), as opposed to fleeing war (53%) and political persecution (59%), these differences likely reflect ceiling effects.

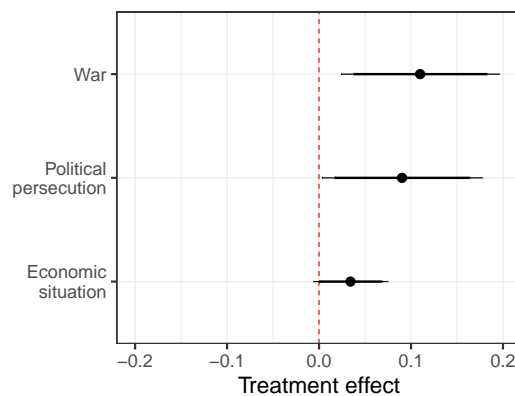


Figure T.1: Limit the immigration of refugees and asylum seekers fleeing...

U Subjective health

Respondents were asked to rate their overall subjective health on a scale from 1 to 5. Whereas the terrorist attacks have an immediate and considerable impact on refugees' mental health and distress, Germans subjective wellbeing does not change in the aftermath of the attacks, with effect estimates remaining statistically insignificant and close to zero throughout each treatment period.

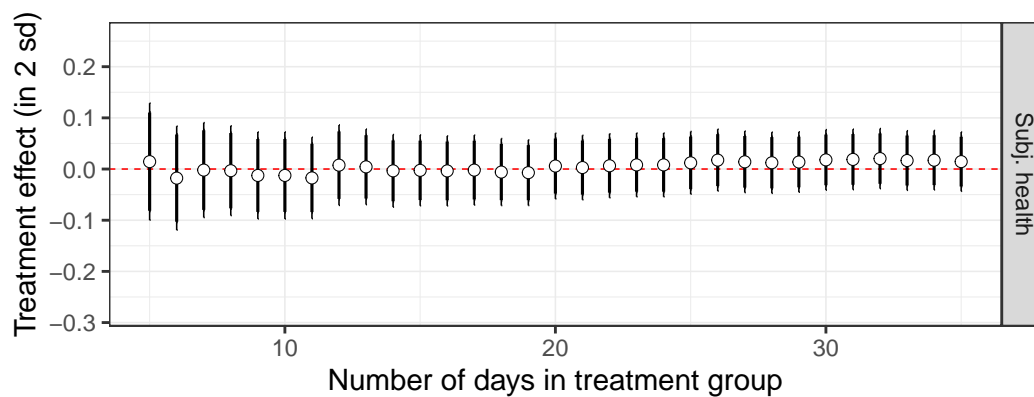


Figure U.1: Impact of the July 2016 terrorist attacks on Germans' subjective health assessment.

V Fieldwork periods

Table A.9: Fieldwork period, German sample

Date (week)	Respondents
Tue, 5 Apr 2016	41
Fri, 8 Apr 2016	231
Fri, 15 Apr 2016	413
Fri, 22 Apr 2016	381
Fri, 29 Apr 2016	307
Fri, 6 May 2016	241
Fri, 13 May 2016	140
Fri, 20 May 2016	116
Fri, 27 May 2016	82
Fri, 3 Jun 2016	49
Fri, 10 Jun 2016	45
Fri, 17 Jun 2016	25
Fri, 24 Jun 2016	103
Fri, 1 Jul 2016	210
Fri, 8 Jul 2016	171
Fri, 15 Jul 2016	122
Fri, 22 Jul 2016	122
Fri, 29 Jul 2016	95
Fri, 5 Aug 2016	82
Fri, 12 Aug 2016	70
Fri, 19 Aug 2016	54
Fri, 26 Aug 2016	59
Fri, 2 Sep 2016	60
Fri, 9 Sep 2016	42
Fri, 16 Sep 2016	10

Table A.10: Fieldwork period, Refugee sample

Date (week)	Respondents
Fri, 17 Jun 2016	57
Fri, 24 Jun 2016	79
Fri, 1 Jul 2016	105
Fri, 8 Jul 2016	145
Fri, 15 Jul 2016	155
Fri, 22 Jul 2016	143
Fri, 29 Jul 2016	126
Fri, 5 Aug 2016	192
Fri, 12 Aug 2016	177
Fri, 19 Aug 2016	225
Fri, 26 Aug 2016	177
Fri, 2 Sep 2016	168
Fri, 9 Sep 2016	195
Fri, 16 Sep 2016	223
Fri, 23 Sep 2016	248
Fri, 30 Sep 2016	119
Fri, 7 Oct 2016	60
Fri, 14 Oct 2016	112
Fri, 21 Oct 2016	152
Fri, 28 Oct 2016	128
Fri, 4 Nov 2016	171
Fri, 11 Nov 2016	189
Fri, 18 Nov 2016	237
Fri, 25 Nov 2016	220
Fri, 2 Dec 2016	236
Fri, 9 Dec 2016	276
Fri, 16 Dec 2016	150
Fri, 23 Dec 2016	53
Fri, 30 Dec 2016	9

