Knowing is Half the Battle: How Education Decreases the Fear of Terrorism

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September 30, 2021

Word Count: 10,987

Abstract

Although only 23 people on average have been killed per year by terrorist attacks in the United States since 2001, American citizens and politicians consistently rank terrorism as a top security threat, leading to costly wars abroad and the repression of civil liberties at home. To what extent can education about terrorism alter perceptions of the threat? Much existing scholarship—and consistent polling over the past two decades—suggests that it cannot, but we disagree. Evidence gathered from an extensive series of experimental and observational surveys involving students in 31 terrorism and non-terrorism related courses at 12 universities—including massive open online courses (MOOC) and online surveys—reveals that the more individuals learn about terrorism, the smaller they perceive the threat to be to themselves and to the U.S. In the fight against terrorism and the fear it inspires, knowing really is half the battle.

Terrorist attacks' main impact comes not from those killed—3 people on average, and most commonly none—but rather from the fear they inspire "in an audience beyond the target" (Hoffman 2006)[1]. It is this fear that makes the millions scared of the few and has been unrelenting in the United States since 9/11. Could education about terrorism succeed where other counterterrorism policies have failed?

From 2001 to 2020, nearly half of Americans were very or somewhat worried that they or someone in their family would become a victim of terrorism, and over 60% of Americans worried a great deal or a fair amount about terrorist attacks against the U.S. (Gallup 2021). American citizens and politicians from both major parties have long identified terrorism as the biggest security threat to the United States, including almost every Democrat and Republican nominee for president since 9/11 (Jackson 2010). None of these figures on threat assessment have varied significantly over the past two decades, despite trillions of dollars spent and thousands of lives lost in counterterrorism operations.

A growing number of scholars have questioned the significance of the terrorist threat to the U.S. (Brooks 2011). As early as 2006, John Mueller argued that "Although it remains heretical to say so, the evidence so far suggests that fears of the omnipotent terrorist— reminiscent of those inspired by images of the 20-foot-tall Japanese after Pearl Harbor or the 20-foot-tall Communists at various points in the Cold War (particularly after Sputnik)— may have been overblown, the threat presented within the United States by Al Qaeda greatly exaggerated" (Mueller 2006). Although Mueller has helped convince a significant number of academics, he nonetheless recently concluded that nothing can be done with regard to the public: "There seems to be little, if anything, policymakers can do to reduce the fear of terrorism—whether it is through shouting from the bully pulpit or through spending trillions of dollars to protect people from the feared hazard. If people want to be afraid, it seems, nothing will stop them" (Mueller & Stewart 2018). Some scholars have further concluded that education levels don't drive perceptions of the terrorism threat, and that when it comes

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[1]A violent act is commonly defined as "terrorism" if it is committed by a non-state actor against non-combatants for political ends.

to exposing people to new information about terrorism, "data do not matter" (Nellis & Savage 2012, Kearns, Betus & Lemieux 2019).

Other scholars and politicians believe that more information will indeed change people's perceptions, but they conclude that such exposure will *increase* perceptions of the terrorist threat. Many scholars agree that information gained via media exposure makes individuals perceive terrorism as a larger threat that requires more hawkish counterterrorism policies (Williamson, Fay & Miles-Johnson 2019, Matthes, Schmuck & von Sikorski 2019, Gadarian 2010). Edward Herman and Gerry O'Sullivan further claim that it is not just the media, but rather the broader "terrorism industry" of politicians and experts that overhype the threat of terrorism for their own ends and effectively scare the public (Herman & O'Sullivan 1989). Soon after taking office in 2017, President Donald Trump's administration implicitly endorsed the idea that more information leads to increased threat perceptions by releasing a list of 78 terrorist attacks that occurred between 2014-2016. When questioned about the list, White House Press Secretary Sean Spicer said, "What we need to do is to remind people that the Earth is a very dangerous place these days." (Spicer 2017).

However, both those who argue that the public's perception of the terrorism threat cannot be changed, and those who argue that more information will only increase it, are wrong. Learning more about terrorism from scholars does change people's minds, but unlike "terrorism industry" critics suggest, it decreases people's perceptions of the threat. By learning extensively about terrorism's causes, strategies, and effects in a dispassionate classroom environment that separates fear from knowledge—rather than from a shallow, emotional media—the unknown and scary become known and categorized (Hogg 2007). Individuals transition from seeing terrorists as crazed and irrational to more human and comprehensible, if still immoral (Fischer *et al.* 2011, Theriault, Krause, & Young 2017). If terrorists' central strategy is to inspire fear, then actual education—not a soaring political speech or another "breaking news" story with 72-point font—is the antidote to inspire calm and resiliency.

We analyze an extensive series of experimental and observational surveys, finding that

the more people learned about terrorism, the smaller the threat they believed it posed to themselves and the United States. This outcome was consistent whether subjects were American students in semester-long, in-person courses at prestigious universities, students from around the world in multi-week massive open online courses (MOOCs), or the general public observing 10-minute video lectures. The trends did not occur in multiple control groups, and these findings generally replicated across 31 classes, 16 professors, and 12 universities. The effect was most significant in the most controlled environments, with a true survey experiment and as-if randomized research design. Even in the noisiest samples, our results suggest that more knowledge on the topic led to decreased threat perception. Not a single finding across all four waves of the survey suggests that more subject knowledge leads to increased threat perception.

Our findings have significant implications for foreign policy, civil liberties, and public health. Polling since 9/11 consistently reveals that about 75% of Americans believe that a large terrorist attack is likely to happen in the U.S. in the near future, a fear which has helped spur the U.S. to fight numerous costly, ineffective wars across the Middle East and North Africa in the name of counterterrorism (Mueller & Stewart 2018, Savun & Phillips 2009). These wars, coupled with burgeoning domestic counterterrorism programs, have led to disproportionate government spending and ballooning deficits (Friedman 2011). A larger perceived terrorist threat has also driven a significant increase in restrictions on civil liberties and immigration, particularly for those of Middle Eastern descent (Hetherington & Suhay 2011, Malhotra & Popp 2012). Heightened fears of terrorism have caused widespread stress and anxiety in the public—sometimes leading to chronic PTSD—and made industries like travel and tourism suffer (Comer & Kendall 2007, Alderman 2016). Increasing knowledge about terrorism therefore may mitigate some of its most deleterious effects by inoculating the public against the fear that its perpetrators seek to inspire.

The rest of the article proceeds as follows. First, we present and analyze theories of information acquisition and attitude change to animate competing arguments on perceptions

of the threat of terrorism. Next, we describe our four waves of studies—from quasi- to true experimental—which were designed to test the main predictions of the arguments. Then, we present our findings and discuss their interpretation. We conclude with an analysis of the significant scholarly and policy implications of our research.

Why People are Unlikely to Change Their Beliefs (Especially About Terrorism)

Although some politicians and academics want to change people's minds, the scholarly consensus is that significant and sustained belief change—especially regarding the threat of terrorism—is difficult to achieve. Beliefs often persist because individuals employ motivated reasoning and a variety of heuristics to maintain prior beliefs and discount new evidence. Due to cognitive dissonance and confirmation bias, people selectively use and interpret new information as consistent with preexisting beliefs, so that "information acquired early in the process is likely to carry more weight than that acquired later" (Nickerson 1998, Taber & Lodge 2006). Individuals' beliefs are often tied to prior knowledge and prominent examples through the heuristics of anchoring, availability, and representativeness (Blankenship *et al.* 2008). When faced with information that challenges their prior beliefs, people may react by becoming even more extreme and/or certain in their original attitudes—the "backfire effect"—especially with an emotional or partisan issue (Nyhan & Reifler 2010). "People set high thresholds of evidence to refute cherished points of view," employing defensive motivations that generate attitude stability when focusing on an issue they care deeply about, like poverty or race (Albarracin & Shavitt 2018, Lawrence & Sides 2014).

There are few more salient, emotional, and politicized issues over the past two decades than terrorism. By the start of our data gathering in 2012, terrorism had been one of the most reported phenomena in the world for over a decade. The numerous prominent attacks provide examples for individuals to draw on via heuristics to create stable beliefs on the size of the threat and desired counterterrorism policies, which they are motivated to defend (Sunstein 2003). Subjects will thus rarely be uninformed, and if anything are likely to be

misinformed given the media's skewed portrayal of terrorism, which makes related opinions more resistant to change (Kuklinski *et al.* 2000). The imagery of planes crashing into skyscrapers and civilian bodies torn apart by suicide bombers inspires the most powerful of emotions. And although politicians from both parties have noted the significance of the terrorist threat, the issue has been increasingly politicized, with Republicans suggesting a higher threat level than Democrats (Malhotra & Popp 2012).

In a classroom environment with frequent two-sided presentations of information, scholars suggest that confirmation bias is even more likely, since individuals tend to latch onto new evidence that confirms prior beliefs and criticize evidence to the contrary.[2] Even those who are skeptical of the backfire effect nonetheless agree that there is evidence of the phenomenon with respect to highly salient policy issues like terrorism (Wood & Porter 2019). As for knowledge itself, the most relevant experimental study to our own supports the view that "data do not matter," as the presentation of facts on the terrorist threat generally did not change individuals' beliefs (Kearns, Betus & Lemieux 2019). Other scholars argue that the credibility of the information source (professor or media) and subjects' education levels have no significant effect on assessments of the threat of terrorism (Nellis & Savage 2012).

When beliefs do change in response to new information, the size of the change is often small—one-third of a standard deviation or less, on average—and the least central parts of an individual's opinion are changed first (Albarracin & Shavitt 2018). These small changes often do not last, and even when they do, they rarely translate to changes in policy preferences (Lawrence & Sides 2014, Pierro *et al.* 2012). Nonetheless, exposure to new information can and has changed beliefs and even policy preferences on a number of key issues including immigration (Grigorieff, Roth & Ubfal 2018), free trade (Hainmueller & Hiscox 2006), prisons (Gilens 2001), and climate change (Ranney & Clark 2016). Can the same happen for terrorism, and if so, in which direction will individuals' beliefs shift?

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[2] Presenting competing pieces of information often makes people more committed to their initial views, due to motivated reasoning based on biased processing of new information (Taber & Lodge 2006).

How Knowledge Can Increase or Decrease Threat Perceptions of Terrorism

Given the absence of a theoretically clear, empirically powerful answer to whether and how education impacts perceptions of terrorism, we present and test two competing hypotheses: increasing one's knowledge of terrorism will increase (H_1) or decrease (H_2) one's perceptions of the threat. At the outset, we did not favor either hypothesis, or the corresponding null hypothesis of no change detailed in the previous section. Most studies on the perception of the terrorist threat have focused on the media, as it is by far the most common source of information on terrorism for the general public (Williamson, Fay & Miles-Johnson 2019). Scholars consistently find that increased media consumption correlates with increased fear and perception of the size of the terrorist threat, as well as support for more hawkish policies (Matthes, Schmuck & von Sikorski 2019, Nellis & Savage 2012). These findings dovetail with the cultivation hypothesis from criminology: "Individuals adjust their perception of reality to fit the image of the world around them derived from media consumption" (Ridout, Grosse & Appleton 2008). Since the media disproportionately focuses on violent content, individuals assess a higher threat of terrorism the more they follow the news.

Regardless of whether one is learning about terrorism in a classroom or on television, the use or threat of violence by a non-state group against civilians to spread fear or alarm for political ends is a scary prospect. Learning about more attacks by more groups who kill in more deadly and fear-inducing ways than most students previously knew (e.g. Sarin gas attacks by Aum Shinrikyo) will likely increase their perceptions of the size of the threat. From 2012-2015, when students were taking these courses, the number of terrorist attacks around the world significantly rose each year, meaning that objective teaching of the data should drive students to revise upwards their assessments of the total number of attacks and corresponding threat (LaFree & Dugan 2007). The number of jihadi terrorist groups also consistently rose during this period, making systematic teaching of the most prolific terrorist groups and their burgeoning networks (e.g. Boko Haram and ISIS) likely to increase threat assessments (Jones 2014).

Rather than discount media coverage, some scholars find that more knowledgeable individuals are more likely to have increased perceptions of the threat after consuming terrorism-related media (Ridout, Grosse & Appleton 2008). Others suggest that, "Unlike the fear of crime literature where mastery of the topic or context reduces fear, in the context of terrorism, mastery may actually reinforce fear" (Williamson, Fay & Miles-Johnson 2019). The knowledge gained from classes may therefore exacerbate the effects of a sensationalist media, rather than inoculate students from it. Furthermore, as many professors push students to pay greater attention to relevant news stories during their course, students may consume even more terrorism-related media than usual as part of their "treatment."

On top of this, college courses generally teach and push students to find the weaknesses in the theories and evidence of academic research. Students who previously may have sided with academic-led claims of a lower terrorist threat may therefore emerge from their courses with a more skeptical view of research they previously venerated. It is also wrong to describe the courses themselves as emotionless; courses on terrorism regularly include classes on the role of emotions, and students are not told to neglect or hide emotional reactions to the content. This increase in fear, exposure to new knowledge about increasing terrorist attacks and jihadi groups, greater understanding and consumption of relevant media, and skepticism of academic research may also lead to increased terrorism threat perceptions (Davis & Silver 2004). This yields our first hypothesis:

Hypothesis 1 *Taking a course on terrorism and increasing one's knowledge will increase one's perception of the threat of terrorism.*

Fear increases when individuals are uncertain or feel that they lack control. By learning extensively about terrorism's causes, strategies, and effects, individuals transition from seeing terrorists as crazed and irrational to more human and comprehensible, though still immoral (Fischer *et al.* 2011, Theriault *et al.* 2017). The unknown and scary becomes known and categorized, giving individuals a greater sense of certainty and control regarding the

probability that terrorism will affect them and their society, in line with Hogg's uncertainty-identity theory (Hogg 2007).

The way in which college classes on terrorism are taught uniquely lends itself to this decoupling of fear and knowledge. Whereas the media generally presents them hand in hand—and indeed seeks out emotional, sensationalist stories—scholars generally aim to dispassionately and objectively analyze the definition, history, and impact of the phenomenon. Gadarian (2010) offers the most sophisticated study on media exposure, finding that the emotional nature of its delivery played the key role in shifting individuals' policy preferences. She separated the two key elements the media provides—knowledge and emotion—and found that the former had little to no impact without the latter. Students in classes thus gain new knowledge without the same emotional baggage and learn how to systematically examine information separate from partisan media environments (Halperin *et al.* 2013).

The two-sided, analytical classroom environment shifts terrorism from a value-relevant to outcome-relevant issue for students who care about getting good grades, thereby making objective analysis and the search for accuracy more likely (Fishkin *et al.* 2010, Hart *et al.* 2009). In addition to gaining a new objective mindset and information from more credible sources over a series of months, students correspondingly learn to be more skeptical of their main source of terrorism knowledge—the media—"When an individual increases her political knowledge, she reacts less radically toward threatening news, and shows greater cynicism toward potentially biased news sources" (Carriere, Hendricks & Moghaddam 2019).

Even though individuals likely join college courses with extensive prior exposure to terrorism, their knowledge is likely not representative of the phenomenon or the threat it poses. In addition to data-driven discussions of the likelihood of a terrorist attack (which is far less than suggested by media coverage), students will also be exposed to "hidden knowledge" of terrorist groups that are less threatening either because they don't aim to kill (e.g. the Earth Liberation Front) or because they come from the student's societal and demographic in-group (e.g. The Weather Underground), rather than the prolifically violent and foreign

out-groups (e.g. ISIS) that dominate media coverage and individuals' impressions of terrorism (Hammond & Axelrod 2006). This increases the chance that the heuristics used by students to assess the level of threat will no longer be the most violent and scary examples they previously utilized. This decrease in fear, emergence of an objective mindset, discounting of media accounts, and increase in hidden knowledge about lesser known groups will lead to a decrease in terrorism threat perceptions. All of these arguments yield our second hypothesis:

Hypothesis 2 *Taking a course on terrorism and increasing one's knowledge will decrease one's perception of the threat of terrorism.*

Existing Challenges: A Focus on Small, One-Sided Media Treatments

The studies referenced above have provided an excellent foundation for beginning to understand the connection between knowledge and beliefs concerning the threat of terrorism. However, they leave a number of empirical gaps that this project aims to address. Most are observational studies that cannot demonstrate causal links, and the treatments of the few (survey) experiments are generally single, isolated statements of fact or opinion without any contradicting information, followed immediately by an assessment of the subject's response. On the one hand, the one-sided nature of the treatments creates a 'most likely' scenario for knowledge and attitude change while raising questions of external validity, because, in reality, conflicting information is generally provided from multiple sources, be they media, friends, or otherwise. On the other hand, the small amount of information provided to subjects—a paragraph or two of information on terrorism—is often not enough to change minds. This can lead to the conclusion that knowledge does not matter for beliefs and policy preferences, when in fact it very well might, just not when it's a drop in the bucket compared to the ocean of preexisting knowledge to which individuals have already been exposed.

All of these studies focus on the media or embedded survey experiments, but one of the most common and powerful ways to increase one's knowledge is through formal education.

Unlike one-shot information prompts, a semester-long course provides an opportunity for substantial, enduring changes in knowledge and attitudes (Pierro *et al.* 2012). A few studies have analyzed the impact of college courses on political knowledge and attitudes, although none have focused on terrorism specifically. Scholars have found that a single semester course in economics increased students' knowledge and made them more conservative on economic issues, meaning that they increasingly supported free markets and greater restrictions on workers' unions (Jackstadt, Brennan & Thompson 1985). A semester-long course on the death penalty also changed student attitudes, in line with the Marshall hypothesis that the more you know, the less you support it (Cochran & Chamlin 2005).

In these studies that have analyzed knowledge and attitudes at the beginning and end of a semester, the vast majority examine a single treatment class taught by a single professor. Most studies do not assess whether the findings replicate the following year with the same class, same professor, and new students. They do not analyze the same professor teaching multiple treatment and control classes, different professors at the same institution teaching treatment and control classes, or different professors teaching the same topic (i.e. terrorism) in different fields (i.e. history and political science). Additionally, most extant projects do not analyze different professors teaching treatment and control classes at different universities or compare small seminars, mid-size lecture classes, and Massive Open Online Courses (MOOCs). Perhaps most importantly, most previous studies do not employ random assignment, which is understandable given the institutional and ethical challenges of randomly assigning students to their college classes. Our multi-wave survey research design allows us to address each of these points.

At the same time, our approach is not perfect. We derived each of our hypotheses from a combination of theories whose mechanisms both complement and compete with one another. Our bundled classroom treatments—which combine an increase in familiarity with terrorism, emergence of an objective mindset, skepticism of media accounts, and increase in hidden knowledge about lesser known groups—make it difficult to parse which mechanism

is driving changes in threat perception. As discussed below, we are able to gain some leverage by utilizing course syllabi, additional survey questions, comparison to the responses of students' professors, and varying mediums of information transmission. But our strongest tests (and associated evidence) concern the testing of our core hypotheses across a variety of populations and settings.

Survey Studies: Four Waves Varying in Treatment and Population

To test the competing hypotheses relating to the effect of education on individuals' perceptions of the terrorist threat, we performed four survey studies with varying levels of randomization. In each study, respondents answered a battery of questions relating to several aspects of terrorism before and after treatment—education on terrorism—was administered.[3]

The first study is an as-if randomized study that takes advantage of randomized course registration times for college courses.[4] This survey study was administered by one of the coauthors of this manuscript at their home institution during the Fall 2013 and Spring 2015 semesters. Each survey consists of two waves—pre-course and post-course—to determine how individual respondents' attitudes changed following education provision. For this sample, students who successfully enrolled in a class on terrorism serve as the treatment group, while students on a wait-list for the class represent the control group.[5] This treatment assignment avoids a potential selection bias inherent with using college students as convenience samples because all respondents attempted to take the course, but only those with sufficiently early randomized registration times were able to enroll. The sample for this study includes 35 students in the treatment group and 23 students in the control group.

The second survey expands the student study across a more representative sample of 28 classes in political science, history, and international studies from 11 universities in the

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[3]When using a student sample, institutional review board approval was obtained from each school, and informed consent was obtained from all participants in each of the four studies.

[4]Appendix A includes covariate balance statistics for each of our four samples.

[5]Following the post-course survey, five randomly selected students received $10 Amazon.com gift cards. Participants in the control group who completed both surveys received $20 Amazon.com gift cards.

United States. To establish a sample of classes, we solicited professors' involvement from a coauthor's home institution and members of the National Consortium for the Study of Terrorism and Responses to Terrorism (START) professional email list.[6] Courses focusing on terrorism for more than three weeks were classified as 'treatment' classes, and all other courses were categorized as 'control' classes. Thus, students enrolled in classes specifically on terrorism make up the 'treatment' group and students in other courses serve as the 'control' group.[7] In this wave, we surveyed 253 students in terrorism courses and 133 students in non-terrorism courses. The courses were taught between the Fall 2013 semester and Spring 2015 semester. Here, treatment assignment—education on terrorism—is not randomized. Given the non-random treatment assignment, we use propensity score subclassification— also known as marginal mean weighting through stratification—to achieve better balance on pre-treatment covariates (Desai *et al.* 2017, Hong 2010). We implement subclassification using the `MatchIt` package in `R` (Ho *et al.* 2011).[8] For both studies that employ matching, we match on all available pre-treatment covariates. The matched sample contains 221 treated respondents and 105 control respondents. Given that we have more treated units than control units, we use the resulting weights in the regression analysis. We also cluster standard errors by subclass when reporting measures of uncertainty.[9]

The third study repeats the student survey using a sample of students enrolled in Massive Open Online Courses (MOOCs) during the Spring of 2015. Here, students enrolled in a terrorism course administered by START serve as the 'treatment' group and students enrolled in an online course focused on either Chinese politics or qualitative research methods

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[6]Professors who completed the survey and administered it in their courses received a $50 Amazon.com gift card.

[7]In all but one course, five students were randomly selected to receive $10 Amazon.com gift cards after the final survey wave. In that one course, all students received gift cards due to a state policy on gambling via random incentives.

[8]We demonstrate the improvement in covariate balance following matching and provide more details on the matching procedure in Appendix A. Overall, the matched samples are significantly more balanced after using propensity score subclassification than other common matching techniques.

[9]We find no evidence that individual professors' own threat perceptions drive student responses, as shown in Appendix D.

represented the 'control' group.[10] Our MOOC sample consists of individuals from 98 countries and ranged in age from 15 to 79, with the median respondent being 35 years old. The majority of respondents came from outside of the U.S., with individuals residing in Europe (37%), North America (33%), Asia (14%), South America (8%), Africa (5%), and Oceania (3%). As in the second survey wave, we use propensity score subclassification to achieve better balance given the non-random treatment assignment in this design. The trimmed sample contains a total of 590 treated respondents and 103 control respondents. As in the second survey, these responses are weighted in the regression of the treatment and standard errors are clustered by subclass.

The fourth and final study is a survey experiment on a sample of U.S. respondents contacted through Amazon's Mechanical Turk (MTurk) platform. Individuals ranged from 19 to 82 years old, with the median respondent being 32 years old. The survey was conducted during May 2017. In this experiment, half of the respondents were randomly assigned to receive information on terrorism, and the other half received information on financial crises. Respondents in the treatment group were presented with a definition of terrorism, examples of a variety of terrorist groups, facts relating to the lethality of terrorism, and other educational information.[11] As in the courses described above, respondents in the treatment category were given key information on both sides of the debate over the size of the terrorist threat. Within this survey experiment, we disseminated information through video, audio, and written transcript across three separate samples. Our samples comprised 211 individuals who received information via video, 218 respondents who read the information in a transcript, and 196 individuals who received a solely audio treatment. Additionally, we recontacted the MTurk respondents one week after the original survey experiment was administered to analyze the persistence of the effect of information dissemination on terrorist threat perception.

In summary, our analysis consists of four waves of survey data. The first uses an as-if

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[10]All online courses were administered on Coursera.

[11]We include a full transcript of the treatment and control scripts in Appendix B.

randomized design on a sample of college students; the second consists of an observational survey sample of hundreds of college students across several universities; the third is a sample of respondents from MOOCs; the fourth is a survey experiment of MTurk respondents. By analyzing these four disparate samples, we are confident that our results apply to a broad swath of society. In the case of MTurk survey experiments, previous research suggests that results generalize to nationally representative samples (Clifford, Jewell, & Waggoner 2015, Mullinix *et al.* 2015).

Measurement of Variables

We analyze two outcome variables relating to the threat of terrorism: one that measures individuals' perception of the terrorist threat to themselves (*Personal Threat*) and another that measures individuals' perception of the threat to the United States (*US Threat*). To measure these perceptions, subjects were prompted to rate the size of the terrorist threat to both their personal safety and to the United States on a seven-point scale that ranged from *Not a threat* to *A massive threat*. In waves 1-3 of the survey, we have observations before and after treatment. Because of this, we use a differences-in-differences (DD) research design to evaluate the role of terrorism education in changes to perceptions of the terrorist threat (Angrist & Pischke 2008). In the fourth wave survey, administered via MTurk, we measure respondents' threat perceptions following the information dissemination. For wave 4, we have a single measure of perception for both *Personal Threat* and *US Threat*. Therefore, we estimate linear regressions of these measures rather than the DD design used in waves 1-3. Our primary explanatory variable of interest in all studies is a binary indicator capturing the *Education Treatment* that takes on a value of 1 if an individual is in the treatment group and 0 otherwise.

We check covariate balance by analyzing the standardized mean differences (SMDs) for all covariates, finding that some of our samples are not appropriately balanced. We report these results in Appendix A. Given that we do not achieve ideal randomization in each

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Survey Study	Personal Threat	US Threat
Study 1: As-If Randomized	-0.61*	-1.28*
Study 2: Multi-University	-0.14*	-0.17*
Study 3: MOOC	-0.14*	-0.53
Study 4: MTurk, Video	-0.77*	-1.39*
Study 4: MTurk, Audio	-0.71*	-1.36*
Study 4: MTurk, Transcript	-0.37*	-0.83*

$^*p < .05$

Table 1: This table shows a summary of results across our four survey studies. The estimates from Studies 1-3 are the differences-in-differences (DD) estimates, while those from Study 4 are the estimated treatment effects on a single threat perception measure. All estimates are negative and statistically significant at the .05 level with the exception of the *US Threat* estimate from Study 3.

survey wave, we include several control variables in our models that estimate the treatment effects.[12] We use demographic controls including *Age*, a categorical measure of *Religion*, and a binary indicator that reflects whether a respondent is *Female*. Additionally, we control for an individual's *Political Orientation* using a seven-point scale ranging from *Very liberal* (-3) to *Very conservative* (3). We also include a categorical variable that measures *Education Status* for the models fit to the MTurk and MOOC samples because they are not restricted to college students. Finally, we include three terrorism-specific pre-treatment covariates: self-assessed knowledge of terrorism, interest in terrorism, and initial threat perceptions.

Results

We present our results in chronological order of data collection.[13] First, we present the results of our analysis of individuals' threat perceptions using four waves of survey data as samples. Next, we explore the duration of the treatment effects using respondents from

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[12]As Appendix A shows, Study 4 administered via MTurk is relatively well-balanced. We include covariates in the presentation of these results for consistency.

[13]Due to space constraints, we present a summary coefficient plot for the DD estimates along with DD plots for waves 1-3 and coefficient plots for wave 4 in the main text. Full regression tables are available in Appendix C.

the as-if randomized Study 1 as suggestive evidence and a follow-up survey with MTurk respondents. Finally, we explore the potential mechanisms through which education provision affects terrorist threat perceptions. Table 1 shows the regression estimates for each of the four studies. We consistently find that education on terrorism decreases respondents' threat perceptions.
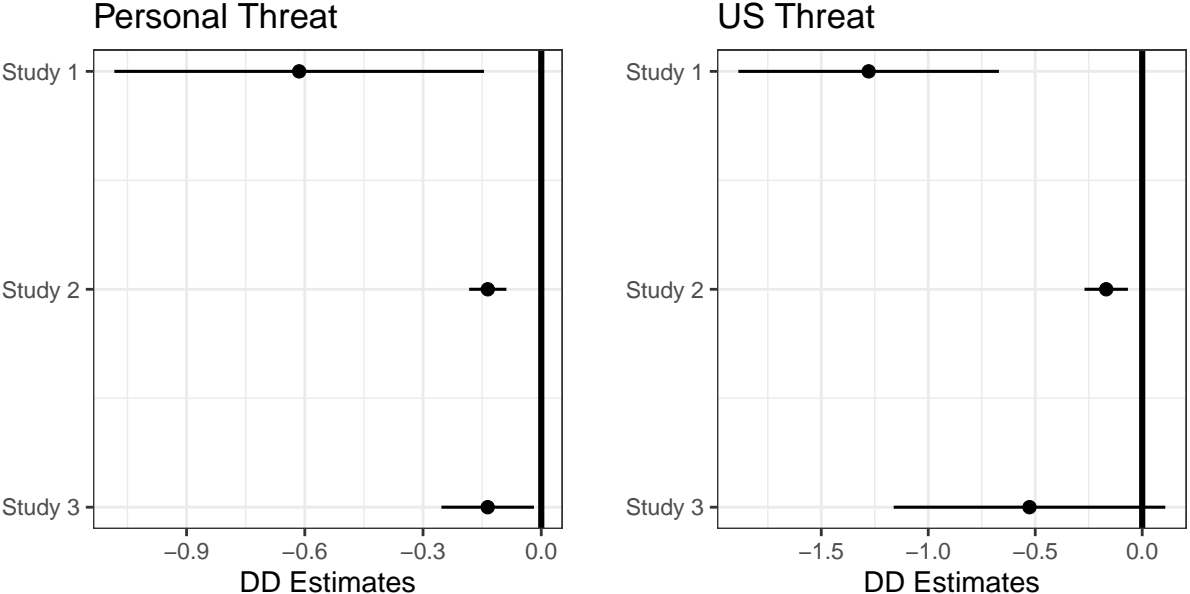

Figure 1: This figure shows the differences-in-differences estimates and 95% confidence intervals for the treatment effect in Studies 1-3. All point estimates are negative, and each estimate is statistically significant at the .05 level with the exception of Study 3, US Threat.

We summarize the results from our DD analysis from waves 1-3 in Figure 1. Here, five out of six DD point estimates are negative and statistically significant at the .05 level. The only estimate that is not statistically significant is the US Threat estimate in Study 3, which is negative but not statistically different from 0. It is important to note the variance in the magnitude of the effects, as the estimates from Study 1 are much larger than those from Studies 2 and 3. We argue that the effect sizes reflect the strength of the treatment relative to the control for each study. Subjects in Study 1 received a full semester's worth of terrorism education relative, while the control subjects did not. This represents the most extreme contrast between treatment and control groups. In Study 2, treated respondents

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received more terrorism-specific education than control respondents, but the difference was not all-or-none as in Study 1. In Study 3, treated subjects received terrorism education while control subjects did not, but the MOOC treatment was shorter and less-direct than the semester-long in-person treatment in Study 1. Thus, we believe that the effect sizes shown in Figure 1 are a function of the contrast between treatment and control groups.
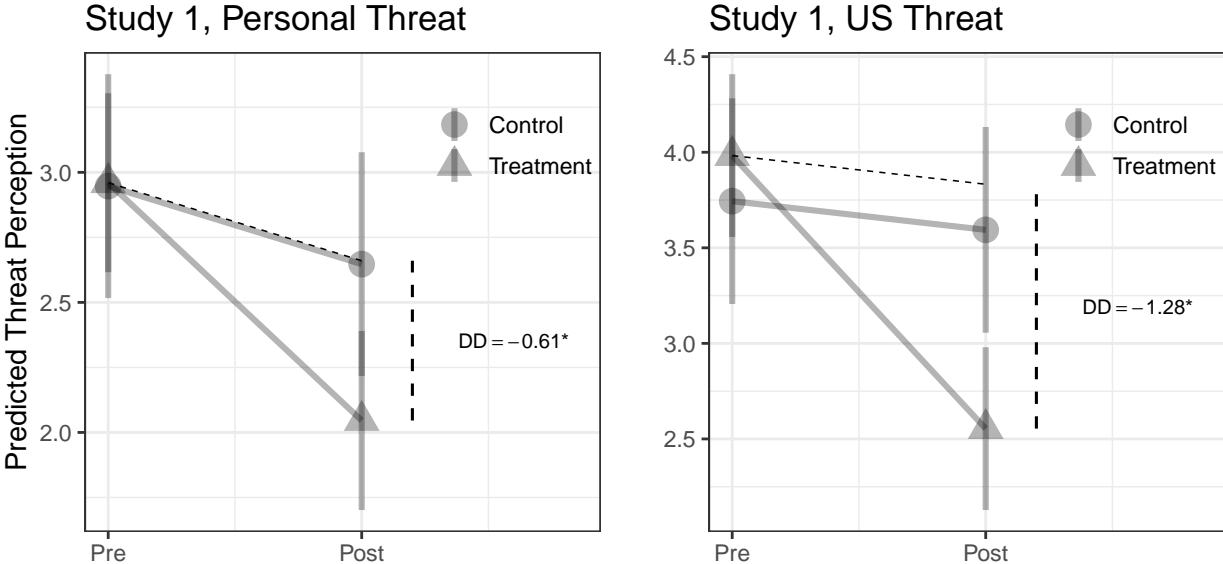
Study 1: As-If Random College Student Survey

Figure 2: This figure shows the differences-in-differences estimate for Study 1 for the *Personal Threat* (left) and *US Threat* (right) outcomes. Triangular and circular points correspond to the estimates for the treated and control groups, respectively. The error bars around the estimates show the 95% confidence intervals. The dashed line from the pre-treatment point shows the counterfactual estimate, and the vertical dashed line shows the magnitude of the DD estimate. The annotation shows the DD estimate along, where * indicates that an estimate is statistically significant at the .05 level.

We present the DD results from the as-if randomized sample of college student respondents in Figure 2. The plot shows the DD estimate—the difference between the actual post-treatment estimate for the treated and the counterfactual estimate—with a vertical dashed line for each outcome variable. Here, we include *Age*, *Female*, *Political Orientation*, *Religion*, *Pre-Treatment Knowledge*, *Pre-Treatment Interest*, and *Pre-Treatment Threat Perception* as

covariates. The models fit to the as-if randomized sample present strong evidence in support of H_2. The DD estimates for the *Education Treatment* are both negative and statistically significant at the .05 level, and the magnitude of the treatment's effect is greater when estimating the level of *US Threat*. Thus, the quasi-experimental results from the first study strongly support H_2, which suggests that education leads to a reduced threat assessment. Next, we examine these relationships in two observational surveys.

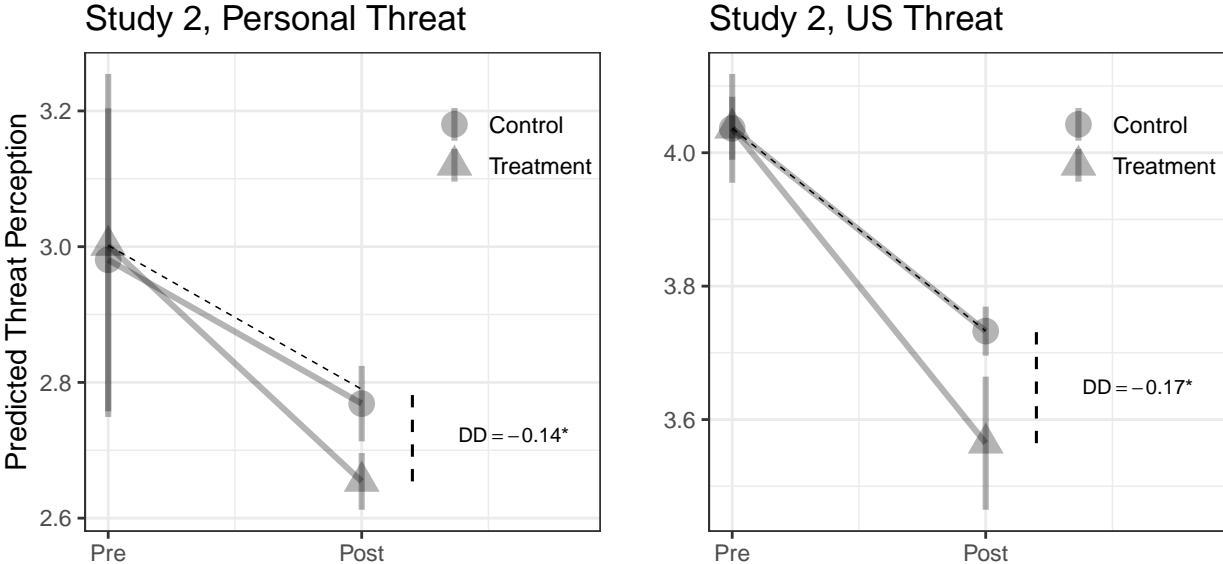**Study 2: Multi-University Student Survey**

Figure 3: This figure shows the differences-in-differences estimate for the *Personal Threat* (left) and *US Threat* (right) outcomes. Triangular and circular points correspond to the estimates for the treated and control groups, respectively. The error bars around the estimates show the 95% confidence intervals. The dashed line from the pre-treatment point shows the counterfactual estimate, and the vertical dashed line shows the magnitude of the DD estimate. The annotation shows the DD estimate along, where * indicates that an estimate is statistically significant at the .05 level.

Study 2 relies on a multi-university survey of students enrolled in college courses explicitly on terrorism ('treatment') and other social science courses ('control'). Given the potential selection bias in this observational survey data, we employ propensity score subclassification to obtain pre-treatment covariate balance. In this case, we match on age,

gender, political orientation, religion, pre-treatment knowledge, pre-treatment interest, and pre-treatment threat assessments. Figure 3 shows the DD estimates and 95% confidence intervals of *Personal Threat* (left) and *US Threat* (right). As in Study 1, the models overwhelmingly support H_2. The treatment effects of the *Education Treatment* are negative and statistically significantly different from 0 at the .05 level for both models. While the effects are statistically significant, their substantive significance is substantially smaller than in the quasi-experimental study discussed above. Here, the models suggest that the *Education Treatment* leads to a decrease in threat perception at the personal and US levels of .14 and .17 respectively on the seven-point threat scale. Thus, while the effects are identifiable, they are noticeably weaker than in the as-if randomized survey (and in the MTurk survey experiment, discussed below). This finding reflects a weaker treatment than in the previous study, as some classes in the 'control' group may have slight topical overlap with the terrorism-focused classes in the 'treatment' group, and some 'treatment' group classes are not entirely focused on terrorism, as are the courses in Studies 1, 3 and 4. As a result, the difference in knowledge gained between these courses will be smaller than the difference between enrolling in a terrorism course versus remaining on the wait-list (Study 1) or the difference between a factual vignette on terrorism versus financial crises (Study 4).

Study 3: MOOC Survey

Our third sample comes from a series of MOOCs in which individuals from the 'treatment' group are those from a terrorism course and 'control' respondents were enrolled in a course on either Chinese politics or qualitative research methods. As in the multi-university study, we use propensity score subclassification to obtain covariate balance by matching on age, gender, political orientation, religion, previous education, pre-treatment interest, pre-treatment knowledge, and pre-treatment threat perceptions. We also use these variables as covariates when calculating the DD estimates. The results, shown in Figure 4, are consistent with those from Studies 1 and 2, showing evidence in support of H_2. The results from the *Personal*
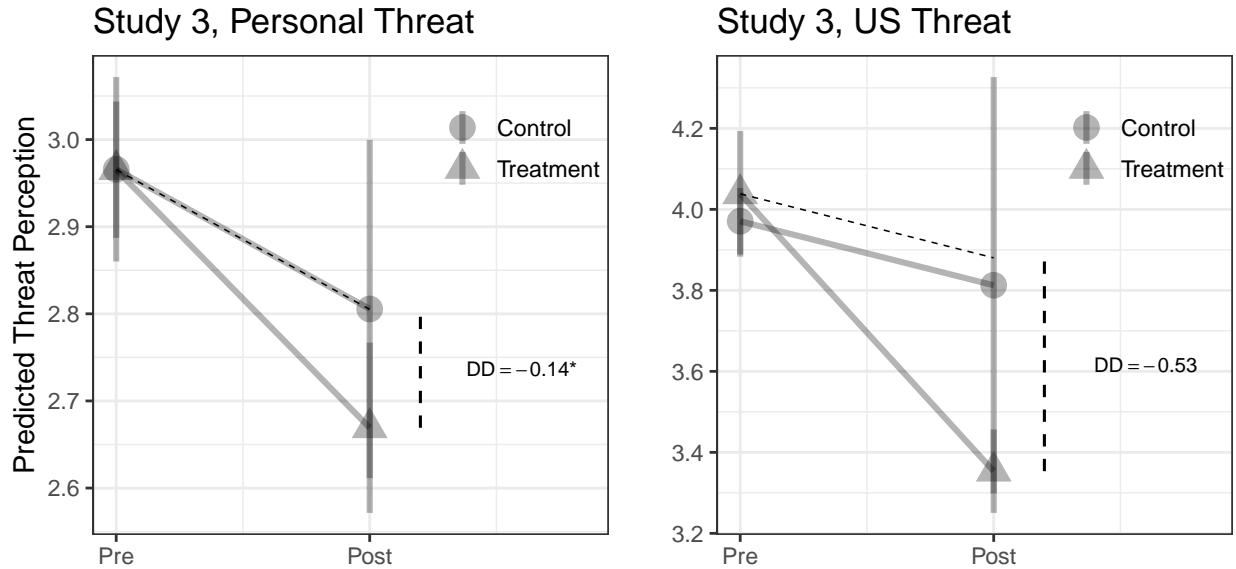
Figure 4: This figure shows the differences-in-differences estimate for Study 3 for the *Personal Threat* (left) and *US Threat* (right) outcomes. Triangular and circular points correspond to the estimates for the treated and control groups, respectively. The error bars around the estimates show the 95% confidence intervals. The dashed line from the pre-treatment point shows the counterfactual estimate, and the vertical dashed line shows the magnitude of the DD estimate. The annotation shows the DD estimate along, where * indicates that an estimate is statistically significant at the .05 level.

Threat model indicate a modest treatment effect of -.14 on the seven-point threat scale, but the effect is statistically significant at the .05 level. The *US Threat* model suggests a substantively larger decrease in reported threat perception, but with substantially more uncertainty. Given the international nature of the MOOC sample—in which only 33% of respondents reside in North America—the lack of statistical significance is not surprising. The effects' magnitudes are in line with the survey experiment and as-if randomized study presented above, as the effects of the *Education Treatment* on *US Threat* are greater than the effects on *Personal Threat*.

Study 4: MTurk Survey Experiment

Finally, Study 4 features survey experiments on a sample of MTurk respondents in which treated individuals received a ten-minute vignette on terrorism via video, audio, or transcript.
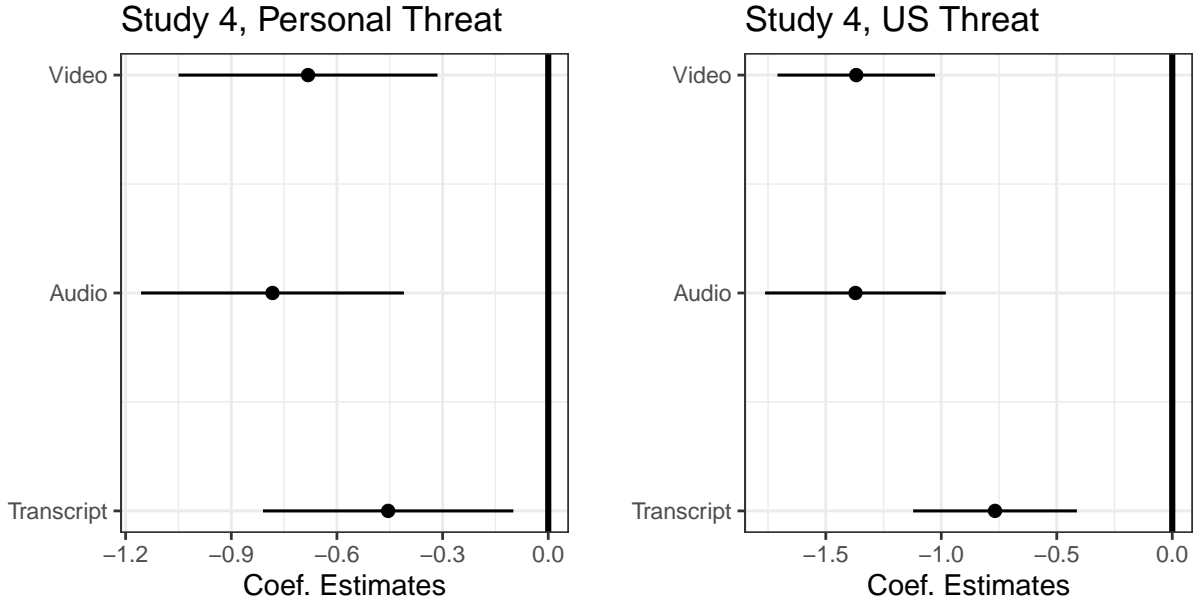
Figure 5: *Education Treatment* Effects on *Personal Threat* (left) and *US Threat* (right) from MTurk Survey Experiment

Respondents in the control group received information on financial crises through similar media. Figure 5 shows the point estimates and 95% confidence intervals for the terrorism *Education Treatment* for both the *Personal Threat* outcome (left) and *US Threat* outcome (right). Each point and error bar represents the estimate from a linear regression model depending upon media through which information is disseminated and includes *Age, Female, Political Orientation, Education Status*, and the *Pre-Treatment Knowledge* as covariates. Overall, the results strongly support H_2, which suggests that education on terrorism will cause individuals to find terrorism less threatening. We find a strong negative effect for the terrorism *Education Treatment* on both *Personal Threat* and *US Threat*. For each of these outcomes, the effect of the treatment is significant regardless of whether the terrorism information was conveyed via video, transcript, or audio. The *Education Treatment* has a stronger effect on the perceived threat to the United States, with assignment to the treatment group leading to more than a one point decrease on the seven point threat scale for the video and audio treatment and a .86 point decrease for the transcript treatment. For both outcomes, the effect of the transcript treatment is the weakest, but it is still significant at

the .05 level.

Duration: Effects Largely Endure

The previous analyses suggest very strong support for H_2, which implies that when individuals learn more about terrorism they will find it less threatening. Our results provide clear evidence for this expectation for both the threat to the individual and to the United States. Indeed, of the 24 estimated *Education Treatment* effects presented above, 21 are negative and significant at the .05 level and 2 are negative and significant at the .10 level. The models identify negative effects in experimental, quasi-experimental, and matched observational survey data. We also consider the duration of the treatment effects in two ways. First, the results from Studies 1, 2, and 3 suggest that the effect has at least some staying-power because they rely on samples from semester-long and several week-long periods. Given that the final threat perception measure is elicited at the end of the semester or MOOC period in these studies, the *Education Treatment* has potentially had some time to dissipate. Even in light of this fact, we find that sustained provision of terrorism information has lasting negative effects.

Additionally, we recontacted individuals enrolled in the Fall 2013 terrorism course from the as-if randomized Study 1 at the beginning and end of the Fall 2014 semester. While the response rates were relatively low—seven and six respondents respectively for the beginning and end of the Fall 2014 semester—we generally saw persistent decreases over time. For example, the average decreases in threat perception during treatment administration (Fall 2013) for this subset of respondents were 1.2 and 1.5 on the seven-point scale for *Personal Threat* and *US Threat* respectively. By the end of the Fall 2014 semester, respondents' threat perceptions remained decreased by 1.5 and 1.4 from their pre-class scores for *Personal Threat* and *US Threat* respectively. Here, *Personal Threat* perceptions continued to decrease up to a year after the end of the initial course, and the decrease in *US Threat* perceptions became slightly weaker but persisted one year after treatment. The endurance of these perceptions

is especially impressive given that the fall 2014 semester coincided with the shocking rise of ISIS. Even given small sample concerns, this analysis provides suggestive evidence that the *Education Treatment* effects are durable.
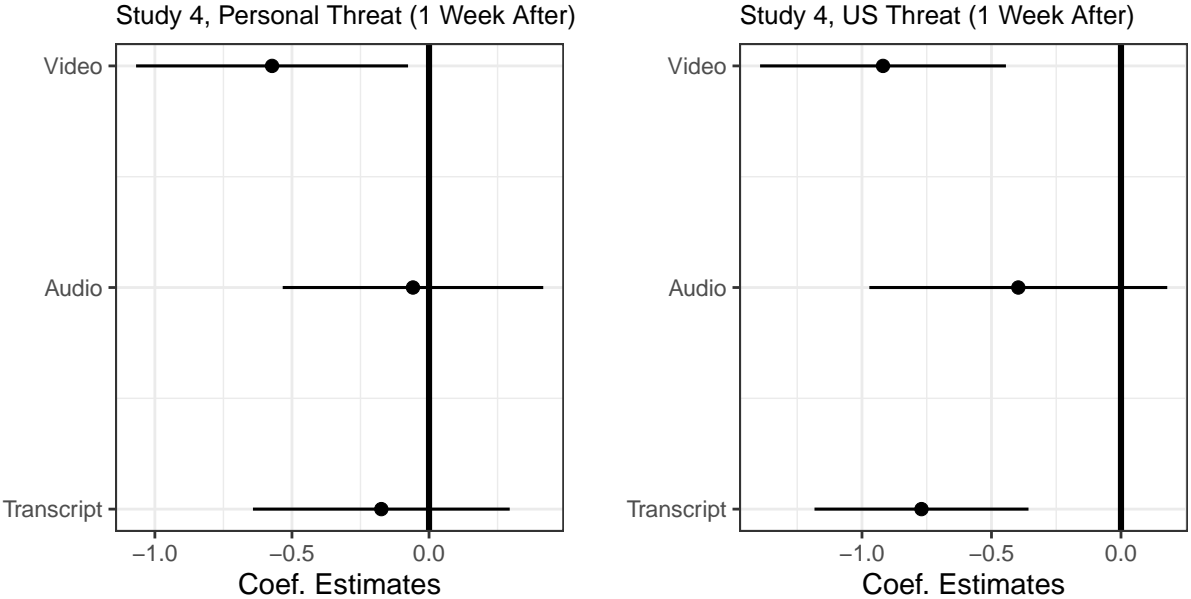

Figure 6: *Education Treatment* Effects on *Personal Threat* (left) and *US Threat* (right) from MTurk Survey Experiment Follow-Up (One Week Post-Treatment)

We also return to the experimental MTurk sample to observe the lasting effects of the treatment. We do so by surveying the individuals involved in the survey experiment one week after receiving treatment and recording their new perceptions of the terrorist threat.[14] The results of the follow-up analyses are shown in Figure 6. Here, we plot the terrorism *Education Treatment* effects on *Personal Threat* in the left panel and *US Threat* in the right panel. The results suggest a durable effect for the video treatment in the survey experiment on both *Personal Threat* and *US Threat*, as these coefficients are negative and statistically significant at the .05 level. Additionally, we find that the transcript treatment has a negative and statistically significant effect on *US Threat* perceptions one week after treatment. We find that the treatment effects on *Personal Threat* are less durable than those on *US Threat*.

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[14]Not all respondents agreed to complete the follow-up survey. 55%, 56% and 62% of the respondents completed the follow-up questionnaire for the video, audio and transcript experiments respectively.

Indeed, the effects on *US Threat* perceptions remain substantively significant as well, with both significant treatment effects reaching at least .80 points on the seven-point threat scale.

Potential Mechanisms

What are the mechanisms behind the strong negative effects of the *Education Treatment* on terrorism threat perceptions? These results are likely due to a combination of fear reduction via the contextualization of terrorism and new associative psychological links to terrorists. Most people had already been exposed to a great deal of information about terrorism before taking a class, but their knowledge was generally a mile wide and an inch deep. Media coverage focuses on shocking images and basic information delivered in sound bites about individual terrorist attacks—often committed by ISIS and Al-Qaeda—most of which are replaced on the news ticker by another incident reported in the same way the following day or week. People therefore have lots of shallow, grisly information with little context to understand it, which is why many are fearful of terrorists they perceive as incomprehensible.

How did our treatments overcome the accompanying confirmation biases and change attitudes? First, the treatment classes provided context and frameworks for the broader phenomenon of terrorism. As course syllabi demonstrated, students analyzed systematic scholarship on the definition, causes, strategies, and effects of terrorism, such as in the work of Hoffman (2006) and Kydd & Walter (2006). Subjects could then mentally organize their knowledge of terrorism more effectively, making them feel more in control and less fearful.

Second, subjects updated their associative links with the concept of terrorism, making it seem less foreign and less deadly (Greenwald *et al.* 2002, Sides & Gross 2013). Subjects learned about a wider variety of terrorist organizations in treatment classes, including a larger number a) from their own societies and b) that kill few people. For a subject population that is mostly white and American, learning about the largely Caucasian and non-lethal Earth Liberation Front and Weather Underground likely helped drive subjects to form new, less

threatening mental associations with what terrorism is.[15] When asked, "Suppose you met someone belonging to a group that had carried out at least one terrorist attack," subjects had a 14-34% increase after treatment in whether they thought that person was similar to them, whether they would get along, and whether they would want to interact with that individual—all suggesting less fear.

We probed further, finding that subjects in the treatment group named significantly more correct terrorist organizations and more Western organizations after taking the classes. However, although we generally find a negative association between naming more correct groups and threat perceptions, the relationship is only significant at the more-lenient .10 threshold in four out of 12 models. The naming of Western groups was also not strongly associated with a decrease in threat perception.

These mechanisms were likely enhanced by the two-sided, objective analysis of new information, which may have helped to avoid backfire and overcome confirmation biases. Professor attitudes did not drive perception change (see Appendix D), but the scholarship they taught at the core of each class may have, which in aggregate suggests a smaller terrorist threat than do the media and politicians. Instead of intentionally pushing counterprogramming, however, professors often set up multi-sided debates and allowed students to grapple with the information themselves in an objective setting less prone to emotional backlash (Gadarian 2010). By producing their own oral and written arguments, many subjects felt greater ownership of their opinions, which shifted towards the median position of the new debates they engaged with (Fishkin, He, Luskin & Siu 2010). In terms of the one-way messaging in Study 4, we find that the more intense, emotional stimuli from video—as opposed to text or audio—yields the strongest and most enduring decrease in perceptions of terrorism. This suggests that although television media may be most responsible for inspiring fear of the terrorist threat, its medium also has the greatest potential to reverse those effects on a wide scale (Cho *et al.* 2003).

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[15]This can help explain why the perceptions of *US Threat* decreased more than *Personal Threat* in all studies except in Study 3, where the vast majority of MOOC students were non-American.

Summary of Results

We find strong, consistent support for the hypothesis that education on terrorism leads to decreased terrorism threat perceptions at an individual and US level. These results hold across an as-if randomized semester-long study, a larger sample of university courses on terrorism, a sample of MOOC participants, and a true survey experiment. We find that the effect of the *Education Treatment* is generally stronger for *US Threat* perceptions than *Personal Threat* perceptions. In addition to the effects being statistically significant, their magnitudes are substantively significant. At the highest end, we find that education can lead to about a .8 standard deviation reduction in *Personal Threat* and about a .97 standard deviation decrease in *US Threat*.[16] Even on the lowest end of magnitudes, we find that individuals' threat perceptions decrease by about .25 standard deviations, which previous literature has identified as a significant shift in beliefs (Albarracin & Shavitt 2018, Jervis 2017). Generally, our effects suggest that the average respondent's threat perception shifted by a full category—from 'medium' to 'small' or 'small' to 'very small' depending on the sample. Additionally, our results provide suggestive evidence that these effects are durable.

Conclusion

Terrorism is a difficult issue on which to change peoples' minds. It is a highly salient, emotional, and politicized topic on which everyone has an opinion thanks to decades of extensive media coverage. William McCants, one of the most prominent scholars of terrorism, is unclear on what can be done about the ubiquitous fear of terrorism: "As for how governments can calm their citizens, I'm at a loss...Every attack is discussed endlessly on television and social media, which heightens fear of future attacks, [and] makes citizens scared of one another" (Mazzetti & Schmitt 2016). Existing research on attitude change further suggests that our treatments—exposure to multi-sided debates about terrorism with no planned, unified message in non-controlled environments—should, if anything, make changes in perception

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[16]These effects come from Study 4 (Video) and Study 1, respectively.

even less likely.

Instead, we found that in four waves of surveys that significantly varied a) the content, duration, and method of knowledge delivery, b) the instructor, geographic location, and subject demographics, and c) the general level of experimental control, the one constant was that the more subjects learned about terrorism, the less they perceived it as a threat to themselves and to the United States. Our findings were statistically and substantively quite significant regardless of subjects' demographics or political affiliation.

One fascinating implication of these findings is that they occurred even though the treatments—largely introductory classes on terrorism—were not designed to generate them. Most studies of attitude change are specifically set up to alter subject attitudes in a certain way, yet have far less substantively significant attitude changes on average than this one did. The vast majority of subjects in this study were in classes where the professors did not even know the hypotheses being tested, and none were given any instructions on how to teach or what to teach. Professors simply administered the surveys to their students at the beginning and end of the semester. The fact that the multi-sided knowledge provided in the classrooms had this degree of impact supports the minority position that two-sided knowledge presentation may be as or more impactful than the one-sided information employed by most politicians and researchers, under certain conditions.

This further implies that not all information and education is created equal, which helps to address the discrepancy between our findings and previous studies that found these factors *increased* threat perceptions. These scholars focused on the content and delivery of the media and its sensationalized, one-sided narrative of a hyped terrorist threat, while our subjects were exposed to the content and delivery of academics—deliberative, multi-sided discussion that decouples emotion and knowledge and focuses on objective analysis (Allen 1991, Fishkin *et al.* 2010).

The direction of this attitude change busts two other contradictory myths about professors: that they are part of a "terrorism industry" that hypes the threat for their own

economic and professional gains (Herman & O'Sullivan 1989), and that they are ideolog-ically indoctrinating students through coursework. Contrary to the stereotypes, the most in-depth study on the impact of terrorism classes demonstrates that, if anything, these schol-ars are putting themselves out of business by teaching classes that leave students thinking the threat is less severe. Furthermore, we find no evidence that student assessments of this issue are driven by their professors' attitudes, as shown in Appendix D.

Scholars of terrorism should be happy to know that their research and teaching may be one of the more effective tools of counterterrorism—which is about more than simply stop-ping attacks. Terrorism's greatest impact is not in the physical damage it inflicts, as Martha Crenshaw explained, "The political effectiveness of terrorism is importantly determined by the psychological effects of violence on audiences" (Crenshaw 1985, 400). The fear that terrorism causes can lead to widespread stress and depression, xenophobia, restrictions on civil liberties, support for authoritarian political leaders and systems, costly foreign inter-ventions, and debt from massive government spending—all of which have occurred in the United States since 9/11 (Carriere, Hendricks, & Moghaddam 2019, Elad-Strenger & Shahar 2018, Huddy *et al.* 2003, Huddy *et al.* 2005, Rosendorff & Sandler 2004).

Despite these costs, many politicians and government officials have not wanted to lower assessments of the terrorist threat. Government agencies have strong incentives to promote the threats they combat in order to increase their budgets, whether their focus is terrorism, drugs, or great power rivals (Friedman 2011). Politicians can use fear to gain support for policies at home and abroad—it was no coincidence that President Trump's list of 78 "under-reported" terrorist attacks was presented just after his executive order banning immigration from seven Muslim-majority countries. Of course, politicians have more skin in the game than academics when it comes to terrorism, as they directly bear the weight of responsibility for keeping their constituents safe and so are likely to be more cautious. Nonetheless, a less fearful public—in addition to the direct benefits to mental health and societal harmony—could create less political demand for inflated threat assessments and excessive government

spending, while depriving terrorists of their most effective tool. Politicians often utilize fear because it gets the public to take an issue seriously. Our study shows that, when it comes to terrorism, we can separate fear from knowledge and appreciation of an issue, like a military that can understand and respect the capabilities of an enemy without fearing it.

We present strong findings regarding the impact of knowledge on threat assessment, but questions remain concerning its mechanisms. We found clear evidence that treatment significantly increased subjects' knowledge of terrorist groups—both overall and specifically from Western societies—and decreased their othering of terrorists. However, we did not find conclusive evidence that the othering or knowledge of particular groups—or the conceptual frameworks and objective context provided—drove a change in beliefs. Having shifted our understanding about what it possible, our findings now set the stage for future studies aiming to better capture mechanisms that could specifically vary the content taught, the pedagogical approach, or disaggregate the bundled educational experience. We did this by disaggregating content delivery into video, audio, and text for Study 4, but it would be logistically and ethically challenging to make substantive changes in content or approach for an entire course. Anecdotal evidence from discussions with students suggests that targeted interviews on why opinions did or did not change could shed further light on mechanisms.

John Mueller, the most prominent proponent of the argument that the terrorist threat is overblown, nonetheless recently concluded that "If people want to be afraid, it seems, nothing will stop them" (Mueller & Stewart 2018). Our study suggests that knowledge can "stop them" and change attitudes on even the most serious and sensitive of subjects. Politicians looking to "do something" to reassure their constituents in response to the threat of terrorism should consider public education campaigns. If terrorists' key strategy is to inspire fear, then education is the antidote. Knowing really is half the battle.

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