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CONTENTS

PREFACE

TO EVEN THE MOST CASUAL OBSERVER, KEY MOMENTS IN THE LAST TWO centuries demonstrate th[e] disproportionate impact that the violent actions of a handful of extremists can have [in] shaping the course of events in the Western world. Not all extremists' acts have ha[d] momentous effects of course, but memorable cases come readily to mind. The attacks [of] September 11, 2001, for example, whose nefarious consequences have been and will rema[in] with us for a long time, and the assassination of Archduke Ferdinand and his wife by [a] Serbian nationalist in Sarajevo in 1914, which unleashed World War I. The Spartacists whos[e] revolutionary zeal contributed to the rise of the right in Germany in 1919 and the Baade[r-] Meinhof Gang which, fifty years later, shook the stability of the young West Germa[n] democracy. Or the anarchists who rocked the European monarchies at the turn of th[e] twentieth century, and Sendero Luminoso in Peru and FARC in Colombia who held the[ir] countries hostage for decades. Bearing in mind all of these, the Islamist extremists, who hav[e] been the salient threat for the last two decades and who are the focus of this book, are b[ut] the latest in a long line.

Violent extremists may have abruptly changed the course of history, both nationally an[d] internationally, but often not in the way they intended. The outcome of their actions depen[ds] more on the response of the establishment that is targeted than on the nature of the action[s] themselves. Who could have anticipated the reaction of the Bush administration to Al-Qaida['s] 9/11 attack, a disastrous war on Saddam Hussein's Iraq that had nothing to do with th[e] attack, to say nothing of the mad carnage of World War I, which broke out following th[e] assassination of the Austrian archduke?

To make their opponents feel threatened, extremists do not need to be well armed, [or] rational, or even very numerous. But their extreme risk-taking behavior makes the questio[n] of what kind of individuals become extremists all the more pressing. What kind of peop[le] embark on a violent, radical course when their chances of success are low and the fight the[y] pick is so asymmetrical in terms of force? Only a few violent groups develop social root[s,] sowing the seeds of broader militant movements and larger insurgencies, and fewer st[ill] succeed in gaining power. Most are ultimately crushed and disappear. So what makes som[e] people form or join groups of violent extremists?

Answering this question has been difficult for social scientists for obvious reason[s.] Extremists are few in number, operate underground, and are hard to reach not least becaus[e] they tend to die young. Whatever they communicate to the outside world is tainted by the[ir] strategic aims—they let us know only what they believe serves their purposes, and it is har[d] to separate truth from obfuscation. Trying to understand their motivation from afar throug[h] introspection does not help either, as the very fact that they are extremists makes the[m] difficult to identify or empathize with.

The powers under attack, too, strive to impose their narrative on events, and demonizi[ng] extremists is an inevitable part of that process. The very use of the label "terrorist" is part [of] the ubiquitous tactic of belittling the enemy's ends while magnifying their means. Sta[te] enforcement agencies and armies are wary of allowing independent scholars access [to] information that might undermine their official rhetoric. It is not even clear whether sta[te]

agencies, under pressure from the paranoia and political impatience that typically infor[m]
"counterterrorism" policies, can afford the time and mental energy to turn the wealth [of]
information that they possess about extremists into a deep understanding of the phenomeno[n].
It is striking that even at a safe historical distance from particular conflicts with extremist[s]
no insightful reports from government agencies seem to surface. The truth could be the fir[st]
victim of conflict not so much because it is censored, manipulated, or strategically kept fro[m]
public view for reasons of "national security," but because it is never reached in the fir[st]
place. There continues to be a yawning gap between what violent extremists can do and wh[at]
we, the public, really understand about them.

———————

The difficulty of researching violent extremism has not deterred people from writing abou[t]
the phenomenon, and the literature is as copious as it is inconclusive. While there are peal[ks]
of high-quality research, with which we shall engage in the book, much of it is based [on]
speculation and armchair theorizing. When there is any evidence at all it is often anecdot[al]
and distorted by selection biases or prejudices.

In this book we take a different and unusual approach. Our point of departure is [a]
surprising fact: *engineers are overrepresented among violent Islamist extremists*. This puzzli[ng]
correlation, the existence of which we establish beyond a reasonable doubt in the fir[st]
chapter, offers a vantage point from which to understand the nature of Islamist extremis[m]
and the mechanisms behind its emergence.

Relying on education as our key variable has several advantages. The level of educati[on]
and, for those who attended university, the discipline of the degree pursued are types [of]
biographic information that are *not very difficult to obtain*; because they are considere[d]
irrelevant for governments' counterterrorism operations, they are unlikely to be classified [or]
strategically manipulated. Data on education are also, in this case, preferable to data [on]
occupation, since *everyone* receives some education and does so *early in life*; in additi[on]
education usually does not change or progress after an individual has gone through th[e]
education system, while occupation does. So these are types of information that we c[an]
potentially acquire about everyone, even extremists, many of whom are old enough to hav[e]
gone to university but are too young to have had a significant career. Lastly, education lev[els]
and types are fairly comparable across the educational systems of different countries.

But there is more to education level and type: their greatest advantage for our purposes [is]
that they reflect actual *behavior* rather than (self-) reported attitudes, and, unlike oth[er]
biographical data that are often available—such as gender, age, or place of birth—they are [at]
least to some extent the result of the subjects' *choice*. As such they carry a wealth [of]
information that can help us uncover important socioeconomic circumstances as well [as]
personal dispositions. The *discipline* of the degree attained in particular has the potential [to]
contain information about personal characteristics. Individuals' preexisting traits an[d]
motivations may determine how they choose among similarly demanding and rewarding b[ut]
otherwise incommensurable areas of study, such as medicine, engineering, economics, a[nd]
law. For those who can afford to select among equivalent courses, their choices are likely t[o]
be less constrained by social or economic factors and thus be a proxy of person[al]
propensities.

These features of education made it both possible and worthwhile for us to put togethe
data sets on the level and type of education of five categories of Islamist activists.

(1) Three large and diffuse groups: militant individuals born and active in a variety
Muslim countries in peacetime; militants born or raised in Western countries; an
nonviolent Islamists from across the Muslim world.
(2) Two more specific groups: Islamist extremists in Iran before the revolution; an
Islamist extremists from around the world who defected and abandoned the ways
violent politics.

We do not include in the main sample larger Islamist insurgent groups such as Bol
Haram in Nigeria, the Shabab in Somalia, the Taliban in Afghanistan, and ISIS in Iraq an
Syria. Even though they now represent a salient threat to Western interests, we believe th
they are significantly different from the smaller clandestine groups. They operate in le
asymmetric conflicts and engage in more traditional warfare; they have a territorial basis an
strategy; and they build up a governance of sorts in the territories they hold, with ric
interactions with local communities. What we know about them indicates that both the
recruitment mechanisms and people's motivations for joining are likely to be very different.

While we focused on smaller groups rather than full-blown insurgencies, we pursued
wide-ranging comparisons across ideologies as we could. We collected data on the educatic
of nine types of right- and left-wing extremists active both before and after World War II: th
early Nazi and Italian fascist movements; the neo-Nazis in Germany and Austria; U.S. an
Russian white supremacists; members of the Spartakusbund, of the Rote Armee Fraktion an
of the Brigate Rosse; and a collection of anarchists active around the world. In total, w
collected biographical data on more than four thousand individuals.

A second, more general advantage of our approach lies in the type of reasoning th
results from starting research with a causal puzzle. Research on complex topics can easi
drown in a sea of conjecture. Bad research is littered with unnervingly long lists of potenti
causes of whatever it is the researcher is trying to explain: asking, for example, "What are th
causes of suicide?" is not likely to be of much help in identifying any of them. By contras
following a method Emile Durkheim put to systematic use, asking, "Why do Protestan
commit suicide more often than Catholics or Jews?" and thus restricting the range of wh
differentiates one group from another, can help isolate some of the causes of suicide.

Similarly, our puzzle compels us to recast the grand questions concerning extremis
within circumscribed limits: whatever conjecture we put forward must be compatible wi
the basic finding that engineers are much more likely (and, as we will see, students of certa
other disciplines much *less* likely) to pursue the violent route of Islamist extremism
Conversely, any inference we draw from this basic fact, by being narrower and well-define
offers greater scope for being testable. Engaging in this exercise opens up unexpecte
implications for extremism of other kinds, both right and left wing, which we compare wi
Islamist extremism in the last three chapters.

There are four classic questions that surround extremism that the correlation at the co
of our book will help us frame in a new and clearer light.

What are the socioeconomic conditions that explain why people join extremist groups?
With respect to Islamist extremists alone, scholars have produced an "almost inexhaustib

lists of precipitating factors, including the failure of secular modernization projects, blocke social mobility, economic malaise, Arab defeat in the 1967 war with Israel, the legacy colonialism and cultural imperialism, and political alienation" (Wiktorowicz 2004b: 3). Whe taking a broader view to include other kinds of extremists, the list becomes even longe Poverty is often invoked, though its presence is uneven at best; in some cases it seems matter but not in others, or if it does it is not with first movers but with second-generatio rebels (see, e.g., Hertog's review [2010] of Krueger 2007). In fact, the opposite effect ha also been detected: there is evidence of a *positive* correlation between *level* of education ar militancy both among Islamist and left-wing radicals (Russell and Miller 1977; Krueger ar Maleckova 2003; Krueger 2007; Berrebi 2007).

To deal with these contrasting predictions, social movement theories have invoke "political opportunity structures" and "political entrepreneurs" able "to frame disconten (Snow et al. 1986; Tarrow 1998; Tilly 2004; Wiktorowicz 2004a, 2004b). Still, concepts su as these are too abstract to distinguish between cases with precision, and it is not appare how they can generate testable hypotheses that can explain why, among larger dissatisfie populations, certain agents were the first to become radicalized or were more prone to joi Social movement theorists themselves have advocated a move away from global theories more mechanism-based explanations (McAdam, Tarrow, and Tilly 2001). Some importa results have been achieved in this direction, for instance, by studying how social networl matter in mobilizing certain individuals rather than others (McAdam 1986; Sageman 2004).

By taking the general question to the specific microlevel of mobilization we aim contribute to this more focused research agenda: we do not look for any general mobilizir factor but for factors that are consistent with Islamic *engineers* rebelling to a greater exte than graduates of other disciplines. Can we identify the socioeconomic conditions to whic engineers are particularly exposed relative to other graduates that could explain the radicalization? And could these conditions be the same ones that contribute to mobilizatic generally?

Do some people more than others have a mind-set susceptible to the lure of extremism?

The idea that, given the "right" socioeconomic conditions, *anyone* can end up an extremi is widespread among social scientists. We are wary of believing that there could be *types* individuals whose hardwired traits make them more likely to become extremists. This is n just because it seems contradictory for a *social* scientist to focus on factors other than "th social." Many among us also hold deep-seated beliefs that are hostile to psychologic explanations—for example, that humans are born tabula rasa or that it is morally wrong assume that there are innate predispositions to embrace certain political ideas.

But there are better justifications for the social scientists' skepticism. These lie in th weakness of the existing psychological studies. While we know that violent extremists a more likely to be male and young, no other feature has consistently emerged. No one ha been able to construct a profile of *the* archetypal extremist. A thorough review of th psychological studies of "the mind of the terrorist" by Victoroff (2005), a psychiatrist, end with somewhat vague statements such as "terrorists are psychologically extreme heterogeneous" and "terrorist behavior is probably *always* determined by a combination innate factors, biological factors, early developmental factors, cognitive facto temperament, environmental influences, and group dynamics" (34–35).

If everything explains then nothing does. Many social scientists thus understandably thin[k] that the "terrorist mind" is a chimera and that by and large extremists are "normal people[]" (Kruglanski and Fishman 2006; Ruby 2002; Silke 1998). Still, it may be premature to come [to] that conclusion. As Victoroff (2005) writes, "the much-cited claim that no individual factor[s] identify those at risk for becoming terrorists is based on *completely inadequate research*" (3[4, emphasis added). Furthermore, an increasing amount of empirically grounded research [in] political psychology, which we review in chapter 6, shows that political preferences [in] general are grounded in personality types and even in genetic dispositions.

The puzzling correlation at the core of our book carries implications that offer a goo[d] opportunity to evaluate the extent to which personality traits matter. Once we control f[or] socioeconomic conditions that lead engineers to rebel we can measure the extent to whic[h] engineers are still overrepresented; and if they are, we can infer that character traits mu[st] matter, given that character likely influences choice of education and vice versa.

There are theoretical grounds to suggest that certain political and ideological orientation[s] can be either promoted by the discipline one chooses to study or be the reason why certa[in] individuals are attracted to a discipline in the first place. As for being promoted, both th[e] Marxist and the Weberian traditions would predict that professional socialization shape[s,] respectively, one's economic interests and one's beliefs about the causal and moral order [of] the world. As for the attraction hypothesis, there are plausible reasons to expect that th[e] choice of different disciplines will be driven by different preexisting talents, tastes, an[d] dispositions.

To what extent is the question of who ends up becoming an extremist a matter of "supply"—different types of people choosing particular types of extremism—or a matter of "demand"—grou[ps] searching for and selecting suitable recruits?

There is a particular mechanism that could explain engineers' overrepresentation an[d] weaken our inferences that socioeconomic circumstances or personality matter and whic[h] speaks to another general question concerning extremists. Theoretical work on the economi[cs] of terrorism (Bueno de Mesquita 2005; Benmelech, Berrebi, and Klor 2010) points [to] recruitment strategies to explain why some well-known "terrorists" come from relative[ly] privileged backgrounds: of all the individuals that at any given point are clamoring to comm[it] violent political acts, organizations select those who seem most likely to succeed, and thes[e] people are more likely to be found among the elites.

This explanation of violent extremists as demand driven seems particularly suited to th[e] case of engineers, who possess technical skills that make them prized recruits among all kin[ds] of extremist groups. This conjecture can be tested by looking in depth at how and wh[y] engineers end up becoming extremists—for instance, whether engineers are found in greate[r] than expected numbers among other types of extremists who have as much interest a[s] Islamist radicals in employing the skills of engineers; and, regardless of the type [of] extremists, whether engineers occupy roles in the organizations that best exploit the[ir] technical skills.

Does ideology matter in determining which types of people join certain groups?

The strategic recruitment hypothesis may not work if different types of people ar[e] attracted to different types of groups, in which case regardless of how groups select, group[s] would receive different types of people: "It is plausible but yet to be proven that differen[t]

types of terrorism disproportionately attract individuals with specific temperaments. Future research should attempt to determine the most likely psychological types among terrorists groups with different political orientations" (Victoroff 2005: 35). We take up this challenge through the focused lens of our puzzling correlation. Are there particular traits among engineers that cause them to be more attracted to the Islamist radical ideology, and if what are these? And do we find that engineers are also attracted by ideologies that have features in common with the Islamist ideology?

In chapter 1 we examine the distribution of engineers and graduates from other disciplines among Islamist radicals active in Muslim countries. In chapter 2 we explore to what extent the rather neglected theory of relative deprivation as a source of radicalization is supported by the data on education of Muslim world extremists. In chapter 3 we probe how robust and exhaustive an explanation relative deprivation really is by analyzing (1) the educational distribution of extremists in countries in which engineers have not been particularly deprived for instance, in Western countries, and (2) whether engineers stand out relative to other graduates even when we vary factors—use of violence, group religiosity, and propensity to defect—that should make no difference as far as relative deprivation is concerned. In chapter 4 we investigate whether the ideology of Islamist extremists—covering an ensemble of beliefs, values, and tastes—has any parallel with that of groups of non-Islamist political extremists: in other words whether Islamist extremists' ideology is more akin to that of the extreme right or the extreme left. In chapter 5 we detail the education of a long list of non-Islamist extremists, both on the right and the left of the political spectrum. Lastly, in chapter 6, we try to discover what might be the character traits and dispositions that distinguish the various types of extremists.

1 We decided to include Hamas because it is a hybrid group that, on the one hand, uses many conventional "terrorist" tacti?
and that for long periods of its existence lacked a territorial basis but, on the other, is larger and more embedded in local
society than typical "terrorist" groups. Leaving it out of the sample would not materially change results.

The Education of Islamist Extremists

ON CHRISTMAS DAY 2009, UMAR FAROUK ABDULMUTALLAB, A TWENTY-three-year-old Nigerian ma[...] arrived from Ghana into Amsterdam's Schiphol airport where he boarded Northwest Airline[...] Flight 253 to Detroit. As the airplane approached its destination, Abdulmutallab disappeare[...] for twenty minutes into the lavatory. Back in his seat, he started fumbling around with h[...] underwear. Neighboring passengers saw his trousers on fire and Jasper Schuringa, a Dutc[...] film director, jumped on Abdulmutallab and subdued him, while flight attendants rushed t[...] the scene with a fire extinguisher. The explosive device he had hidden in his pants failed t[...] detonate and Abdulmutallab was arrested. Authorities discovered that he had been in conta[...] with Al-Qaida elements in Yemen. Just a year earlier Abdulmutallab had received a degree [...] mechanical engineering from University College London.[1]

Two months before Abdulmutallab's attempt, on 13 October 2009, Mohamed Game, [...] thirty-seven-year-old Libyan living in Italy, blew himself up with two kilos of nitrate at th[...] entrance of the Caserma Santa Barbara, an army barracks in Milan. This was the first an[...] thus far only suicide attack attempted in Italy, and Game might have been a "lone wol[...] operator, at most a member of a small local network. Game—who lost his right hand in th[...] attack and is now serving a fourteen-year sentence—has a degree in electronic engineering.

Exactly three months before Game's failed attack, on 13 July 2009, a German cou[...] sentenced forty-seven-year-old German Pakistani Aleem Nasir to eight years in prison for h[...] role as an Al-Qaida facilitator in Europe. Nasir had been traveling regularly to the tribal area[...] in Pakistan, supposedly to trade in semiprecious stones but apparently to transfer money t[...] and coordinate European recruitment for, Islamist militant groups. Nasir is said to have bee[...] enlisting a number of German Muslims for jihad, among them German Moroccan Bekka[...] Harrach, who would become infamous—also in 2009—for his videotaped threats of jiha[...] against the German government, apparently recorded in a hideout in Pakistan. Nasir holds [...] degree in mechanical engineering while Harrach had begun college studies of laser technolog[...] and mathematics before dropping out to take a part-time job in a mosque in Bonn.[2]

Apart from being male and of Islamic faith, these four men have little in common. The[...] vary in terms of nationality, age, the Western country with which they had most contact, an[...] even the extremist network they were part of. They also differ in marital status: Game, Nasi[...] and Harrach had wives and children; Abdulmutallab did not.

Their careers vary greatly, too. Nasir had worked at an energy research institute [...] Karlsruhe before being fired for supposed extremist statements, after which he worked as [...] gem trader. Game, despite his degree, had a history of underemployment and was in deb[...] while Harrach lived off odd jobs. Abdulmutallab never even began a career, jumping straig[...] from his studies into extremist activities.

The only thing they have in common is having studied engineering.

As one would expect there are militant Islamist university or college graduates who hav[...]

not had successful careers after graduation: Faisal Shahzad, the Pakistani man who left a SUV packed with explosives near Times Square in Manhattan on 1 May 2010, is said to have been "unemployed and bankrupt at the time of his arrest," though it is not clear whether h[is] progressive radicalization was the effect or the cause of his unemployment.[3] Wadih El-Hage, a Lebanese man who is serving a life sentence in the United States for his involvement in th[e] 1998 bombings of U.S. embassies in Africa, held minimum-wage jobs in the United States as [a] city custodian and auto mechanic, despite having university training as an urban planner.[4]

However, other extremists abandoned successful careers to devote themselves to t[he] cause. Abdul Subhan Qureshi, leader of the Students Islamic Movement of India, who [is] wanted in India for various attacks, including the ones on the Mumbai trains on 11 July 200[6,] left his wife, three children, and a thriving occupation. Qureshi joined Radical Solutions, [a] computer firm in South Mumbai, in November 1996. According to his coworkers, Qures[hi] was an exceptional worker: "He handled several major independent projects, including a[n] intranet for Bharat Petro-Chemicals carried out by Wipro in 1999, and then join[ed] Datamatics." In just three years, his salary quadrupled. In a letter dated 26 March 2001 h[e] resigned, stating, "I wish to inform you, that I have decided to devote one complete year [to] pursue religious and spiritual matters."[5] For other extremists their careers mattered le[ss] because they came from very privileged backgrounds: underpants bomber Abdulmutallab [is] the youngest of the sixteen children of Alhaji Umaru Mutallab, former chairman of First Ban[k] of Nigeria and former Nigerian Federal Commissioner for Economic Development, and live[d] in a luxury apartment in Marylebone while studying for his engineering degree in London.[6]

And yet, despite their deeply dissimilar employment histories, Shahzad, El-Hage, a[nd] Qureshi all have engineering degrees, just like Abdulmutallab and the others. Shahza[d] "enrolled at the University of Bridgeport, where he received a bachelor's degree in comput[er] science and engineering in 2000, followed by a master's in business administration in 2005.[7]" El-Hage studied urban planning at the University of Southwestern Louisiana in the 1980[s,] interrupted by spells of jihadist training in Afghanistan.[8] Qureshi for his part "obtained [a] diploma in industrial electronics [in 1995], and landed a part-time job at String Computers [in] Mazgaon. Later, in 1996, he went on to earn a specialised software maintenance qualificati[on] from the CMS Institute in Marol."[9]

Socioeconomic background, age, country of origin or relocation, group of affiliatio[n,] employment and family situation—all these features vary among the men discussed thus fa[r.] The only feature they share is a degree in higher education, in particular a degree [in] engineering. This is doubly puzzling when set against commonsense expectations. While w[e] readily accept that the dispossessed are natural candidates for extremism, we are at a loss [to] comprehend why well-off, educated men should join the ranks of jihad. And why woul[d] individuals with a technical mind and training in modern technology have a penchant for [a] movement at once violent, religious, and in many cases, as we will see in chapter permeated by antiscientific beliefs?

AT THE ORIGINS

Evidence of this link is not limited to recent cases. It spans three decades and three continen[ts] and appears in connection with notorious attacks. Mohamed Atta (Egyptian) and Khalid She[ikh]

Mohammed (Kuwaiti), leading figures in the 9/11 plot, both studied technical subjects: or
urban planning in Hamburg, the other mechanical engineering in the United States. In fact, o
the twenty-five individuals directly involved in the 9/11 attacks, eight were engineer
Engineers are, moreover, found right at the beginning of modern Islamist militancy. In 1970
Egypt, three groups considered part of the beginning of modern jihadism had been started o
were led by individuals who had a technical education. Al-Takfir wal-Hijra, which wa
involved in the assassination of a cabinet minister, was founded in 1969 by Shukri Mustaf
an agricultural engineer and former member of the Egyptian Muslim Brotherhood. Shukri wa
radicalized during his incarceration in the Tura prison and Abu Zabal concentration camp
Egypt. The second group—known as the Military Academy Group for its violent occupation o
the Egyptian Technical Military Academy in April 1974, from where it launched a faile
attempt to march on the ruling party's headquarters—was founded in the 1970s by Sal
Siriyya, a Palestinian with a doctorate in the teaching of science (Ibrahim 1980; Kepel 1985
Siriyya, too, had been imprisoned. Finally, an electrical engineer, Muhammad Abd al-Sala
Faraj, played a pivotal role in the group al-Jihad, which was responsible for the assassinatio
of President Sadat in 1981 and became the most notorious successor to the earliest Egyptia
groups (Nesser 2004; ICG 2004). Saad Eddin Ibrahim, an Egyptian sociologist who was th
first to study the early violent Islamists, interviewed thirty-four members of two of thes
groups, the Military Academy Group and Al-Takfir, who were imprisoned in the late 1970
Twenty-nine of them were either university graduates or students, and of the twenty-five fo
whom he reports their area of study, nine were engineers, seven were doctors, five wer
agronomists, two were pharmacists, two were studying technical military science, and on
was studying literature (Ibrahim 1980, 1982).

Engineers were also members of radical student groups in Egypt in the 1970s calle
Gama'at Islamiyya. Ayman al-Zawahiri, who later gained worldwide notoriety as bin Laden'
partner and successor at the helm of Al-Qaida, was a member of one of them. Abdalla
Schleifer, an American Jew who is now a professor of media studies at the America
University in Cairo and converted to Islam in the 1960s, made Zawahiri's acquaintance
1974 when working for NCB news in Cairo. When they first met, Zawahiri, then at medic
school, gave Schleifer a tour of the campus: "during the tour, Zawahiri proudly pointed o
students who were painting posters for political demonstrations, and he boasted that th
Islamist movement had found its greatest recruiting success in the university's two most élit
faculties—the medical and engineering schools. 'Aren't you impressed by that?' he sai
(Wright 2002).

Indications of the link between radical Islamism and engineering are also found beyon
the Middle East. We have already mentioned Abdul Subhan Qureshi, the Indian comput
engineer. Two of the three men who in 1987 founded Lashkar-e-Taiba, a Sun
fundamentalist Pakistani group that fights against India's sovereignty over the State o
Jammu and Kashmir, were professors at the University of Engineering and Technology o
Lahore, albeit not engineers themselves.[10] While appealing to madrasa students and th
disenfranchised, Jemaah Islamiya in Southeast Asia also recruited "many technical facult
members, including architects, engineers, geophysicists, chemists, and robotics engineer
(Abuza 2006: 78). The three leading suspects in the September 2004 bombing of th
Australian Embassy in Jakarta had an engineering background. According to a Tunisia

professor of the history of Islam, 60 percent of salafi-jihadists in his country are trained a engineers.[11]

While the groups mentioned thus far are made up of Sunnis, the phenomenon extends Shiite Islamists too: engineers were prominently represented in Mahmoud Ahmadinejad radical 2005 cabinet,[12] and the former Iranian president himself trained as a civil enginee While he is not a militant, his rhetoric as well as his biography reflect radical leanings: h was among the many engineering students at the University of Science and Technology Teheran who played a very active role in the 1979 Islamic revolution.[13]

Hezbollah, the Lebanese Shiite group, also has a strong link with engineers. Soon after was founded in 1982, Hezbollah established Jihad al-Binaa ("construction jihad"), a organizational branch devoted to the reconstruction of civil infrastructure and priva housing. According to Hezbollah expert Judith Palmer Harik, "this is an interestin organization because it is chock-full of professionals—contractors, engineers, architect demographic experts."[14] Representatives for Jihad al-Binaa estimate that more than tw thousand of their engineers and architects have been involved in the reconstruction Lebanon since the war with Israel in August 2006, which, considering that the estimated tot Shiite male labor force in Lebanon likely lies below three hundred thousand, is a larg number indeed.[15]

A SYSTEMATIC TEST

Several scholars have mentioned the link between radical Islam and science and engineering but more as an oddity than as anything that could help us understand the phenomenon. A fe have speculated about what might explain it,[17] but no one has attempted to find a systemat confirmation of the phenomenon. In fact, no one since Russell and Miller (1977) ha published any research on the type of higher education extremists, whether Islamist otherwise, receive. The few studies that document levels of education are limited and inclu only small or partial samples.[18]

To discover whether the overrepresentation of graduates in general and engineers particular can be confirmed by more than anecdotal evidence, we compiled a list of 49 members of violent Islamist groups in the Muslim world active since the 1970s. It include almost exclusively men for the simple reason that they are the overwhelming majority extremists.[19] We drew from a variety of sources. We took lists of names included in academ literature, we asked colleagues, we combed through government documents, and we visite websites of radical organizations themselves. Then we conducted research on each person gather additional biographical data in news archives in several languages, online sources, ar further official documentation.[20] We mainly sought data on each person's level and type education but also gathered information on age, socioeconomic background, internation mobility, function within groups, and other qualitative biographical information. W supplemented this data-gathering effort with a daily survey of major international and Midd Eastern newspapers from 2004 to early 2010 to record, verify, and research new names they appeared.

The list of names includes individuals who grew up in countries that have either a Musl majority or an indigenous Muslim minority, all of which are non-Western.[21] The list does n

include violent members of groups born or bred in a Western country, which we investiga[ted] in a separate sample in chapter 3.[22] The median year of birth of the three hundred cas[es] whose ages we could establish is 1968. This implies that the median year in which those wh[o] went to university started their courses is 1986–87, with a spread ranging from the mid-195[0s] to the late 1990s.

Our sample consists of members of groups that manifest an Islamist ideology of some kin[d] *and* that employ violence in pursuit of their aims. In cases in which the involvement of [a] given individual was not certain, we erred on the side of caution. For instance, we did n[ot] include prisoners at Guantanamo with the exception of the few among them whos[e] involvement in violent groups was confirmed by other sources.[23]

Our list is not a random sample of the Muslim world's Islamist extremists, and it does n[ot] cover all areas with a presence of Islamist militancy. It leaves out or underrepresents group[s] in South Asia and North Africa, for instance. It also excludes larger insurgent groups like Bo[ko] Haram in Nigeria, the Shabab in Somalia, and the Taliban in Afghanistan, which operate in [a] different strategic context of less asymmetric conflict.

However, the sample spans three continents and three decades, allowing us to investiga[te] how far the phenomenon reaches in both space and time. The list includes individuals fro[m] thirty-five nationalities from a dozen larger groups and almost twice as many smaller group[s,] which injects ideological and organizational variety. The sample includes locally oriente[d] groups struggling against authoritarian regimes (such as Egyptian Takfir wal-Hijra) or foreig[n] occupation (such as Hamas), as well as global jihadists pursuing a millenarian anti-Wester[n] struggle (such as Al-Qaida and its franchises).[24] The list includes members of both small cel[ls] (such as the October 2004 Sinai bombers in Egypt) and larger clandestine networks (su[ch as] Jemaah Islamiya in Southeast Asia). Many of these groups are well-known in the West, b[ut] others, such as the Indian Mujahedeen, are known mostly to specialists. Variation [in] geography, group strategy, and ideology are important because they allow us to put the lin[k] between extremism and higher education in general and engineering in particular throug[h a] stricter test—to see whether it holds independently of the groups' specific makeup or wheth[er] it is more common in some types of groups than in others.[25]

Education Levels

Out of the 497 individuals in our sample, we found some biographical information for 4[35] and educational information for 335 (figure 1.1). Of these, only 28 had less than a secondar[y] education and 76 had completed secondary education (including madrasas).[26] Two hundre[d] thirty-one had undertaken higher education, whether finished or unfinished, and of these [at] least 40 studied in Western countries.

The share of individuals who undertook higher education is remarkable: 69 percent, if w[e] consider only those in the sample whose education we know about (231/335). And even [if] we assume that *none* of the individuals whose education is unknown had higher educatio[n,] the share of those with higher education would still be a hefty 46.5 percent (231/497).[27] Th[ere are] well-known cases of highly educated individuals who carried out violent acts—for exampl[e,] the master bomber of the 2004 and 2005 Bali attacks, Azahari Husin, was an engineer with [a] PhD from the University of Reading and a lecturer at the Technical University of Malaysi[a.]

while Ramadan Abdullah Shallah, a leader of Palestinian Islamic Jihad, received his PhD economics at the University of Durham—are just the tip of a well-educated iceberg.

We cannot, however, rule out the possibility that even the lower percentage is overestimate because proportionally more graduates might have ended up in our sampl Who is included in our list *and* the information we found on these individuals are a functio of the public availability of data. This in turn depends largely on whether the individua came to the attention of the authorities and media because they were killed, captured, investigated. Since university graduates may hold positions that might expose them to greater risk of detection than do nongraduates, they may also be more likely to enter t sample.
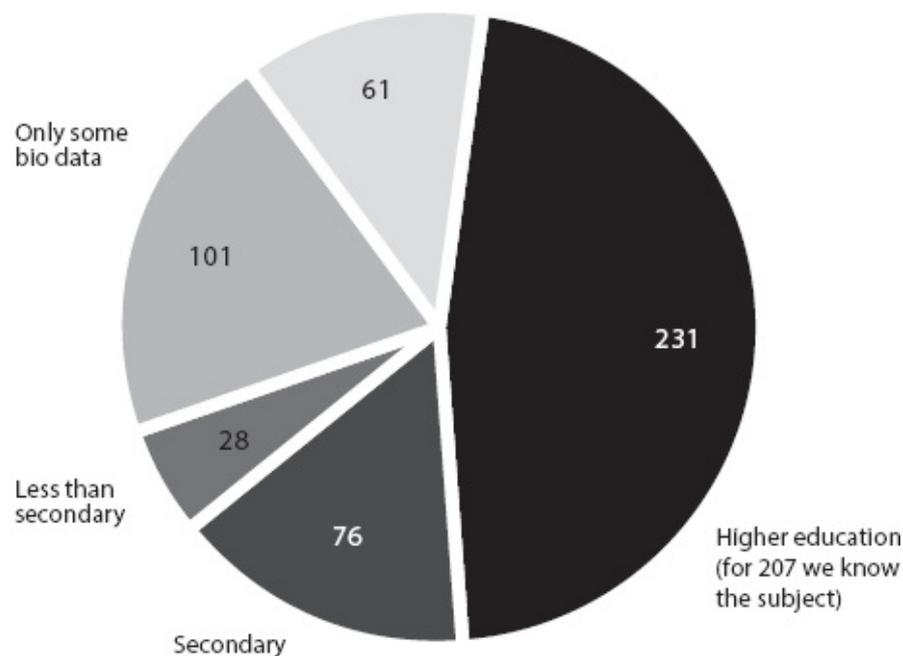

Figure 1.1: Levels of education in the Muslim world sample (497 individuals).
Source: Muslim world sample.

We were able to establish that at least 169 members of our sample exerted a leadersh role in their organization or group—no less than 34 percent of the total sample, making this plausible bias. It may obtain particularly among bigger groups in the sample, such as Jemaa Islamiya in Indonesia or Hamas in Palestine, whose total membership is much larger than t number of individuals in our records. In the case of smaller groups, however—such as th 1970s Egyptian groups and the international jihadi cells we have included—the majority actual members *are* in our sample, somewhat mitigating the bias. If educational levels a broken down by group (see table 1.7), the members of the more exhaustively documente groups have similar levels of education as the members of the partially sampled ones.

The difference between the levels of education in the populations from which the samp is drawn and the levels of education in the sample itself is so dramatic that even a marke selection bias could not plausibly explain it: the rate of tertiary enrollment in all countries the sample in 1987—when the median case in our sample would have entered university was 11.3 percent (weighted average).[28] The odds of being educated are thus, at the ve least, more than six times higher in our sample than they are in the relevant population.

Although we cannot say by how much with precision, there is little doubt that viole

Islamist radicals outside of mass insurgency and civil war settings are vastly more educated than their compatriots. Previous studies have highlighted the high levels of education among specific groups of Islamist militants.[29] The data presented here confirm the phenomenon in a much larger and diverse sample. Although in recent years radical Islamist movements seem to have undergone a process of "proletarization,"[30] looking at the last three decades one finds a strong overrepresentation of the highly educated almost wherever one chooses to look.

Considering the view often taken of such rebels—that they are poor, ignorant, or have nothing to lose—it is surprising to find that so many individuals with university degrees should join militant Islamist movements, given both the personal costs involved and the supposed backwardness of Islamist ideologies. We will come back to this in chapter 2.

Education Types

Of those who attended university, who studied what? Before revealing our results we need to mention that throughout this book we use the same *seven disciplinary groupings* when presenting the types of education for all extremists—Islamist extremists in this and the next chapters and left-wing extremists, anarchists, and right-wing extremists in chapter 5. Our categories include, first, the "big four" degrees, which rely on established knowledge and whose holders typically apply it to professional fields: engineering; medicine; law; and economics, business, and administration. We then further group other disciplines into three clusters. These disciplines, while not having clearly corresponding professions, share methods and core concerns (and often buildings): math and science; social and psychological sciences; and humanities. Unlike the "big four," these disciplines, albeit with greater or lesser rigor, focus on creating knowledge rather than learning how to apply it. When relevant we provide information on additional specific subjects, such as Islamic studies for the sample discussed in this chapter or history for right-wing groups in chapter 5.
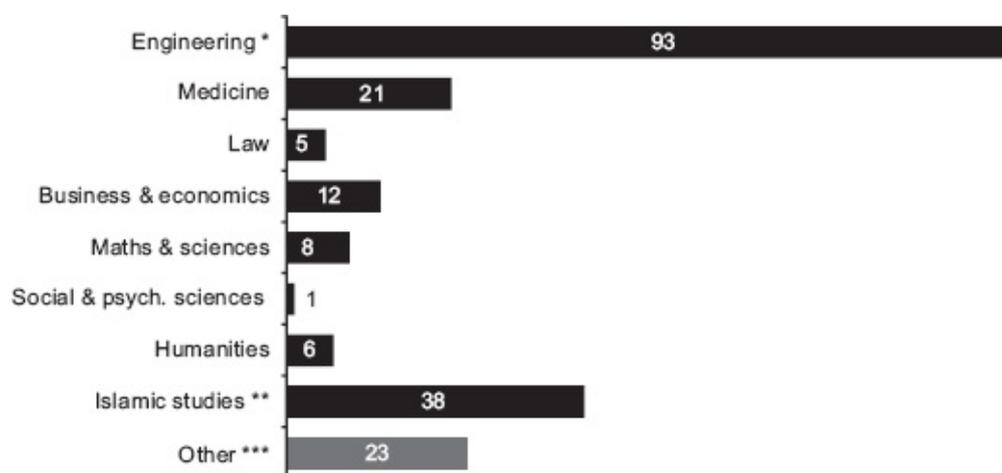
Figure 1.2: Islamist extremists by discipline of study (207 individuals).
   * "Engineering" includes computer science and architecture. The latter was included because it is commonly part of engineering faculties in Middle Eastern countries, as it is in European countries.
   ** "Islamic studies" includes various Islamic subjects such as "Islamic law," "Quranic studies," and "religion."
   *** "Other" includes agriculture, education, English, food sciences, pharmaceutical science, social services, and technical military science.
   Source: Muslim world sample.

In the Islamist sample we were able to find the discipline of study for 207 of the 23[...] individuals who at some point had full or partial exposure to higher education (figure 1.2). Unsurprisingly, the second most numerous group comprises 38 individuals who pursue[...] Islamic studies. But the largest group among the Islamist extremists is that of the engineer[...] 93 out of 207 individuals, or 44.9 percent of those whose type of degree we know, studie[...] this subject. The engineering group is followed at some distance by medicine (21 individuals[...] economics and business studies (12), and math and science (8). On the whole, the individua[...] who pursued what we might call "elite degrees"—engineering, medicine, and science—ma[...] up 58.9 percent of the total. The elite degrees are universally more demanding and hav[...] stricter admission criteria in the countries in our sample than do the other degrees. If we ac[...] economics and business studies, which in some countries such as Egypt is also a selectiv[...] degree (Moore 1994: 46), to the elite category, we reach 64.7 percent. Militant Islamists a[...] not only highly educated but have some of the most prestigious degrees available in the[...] societies. Zawahiri had good reason to feel proud.

The engineers' birthdates (based on the 65 cases for which we could determine then[...] range from the 1930s to the late 1970s, with the median date of birth in 1966—two yea[...] older than the overall median (based on the 300 cases for which we know the date of birth[...] The oldest, born in 1936, is Hamas spokesperson Ibrahim Ghousheh, who graduated with[...] degree in civil engineering from Cairo University. The youngest one is underpants bomb[...] Umar Abdulmutallab, followed by Youssef Mohamad Al-Hajdeeb and Jihad Hamad, tw[...] Lebanese nationals born in 1985 who moved to Germany to pursue engineering degrees b[...] were caught attempting to bomb German trains in 2006 before they finished their course [...] study.

With regard to specific fields of study, three types of engineering predominate for the 5[...] cases for which we have that information: civil, electrical, and computer-related (figure 1.3[...] We do not know whether the distribution across engineering fields means anything or simp[...] faithfully reflects the distribution found in the population of the relevant countries; we cou[...] not find systematic data on this. What we do know is that several illustrious individuals a[...] from these three subdisciplines. Dokka Umarov, the most prominent Chechen Islami[...] military commander and self-proclaimed emir of the unrecognized Islamic state of Caucas[...] Emirate from 2007 until his death in 2013, had a degree in construction engineering.[32] Th[...] one-eyed, hook-armed Abu Hamza Al-Masri, notorious for his firebrand preaching at Londo[...] Finsbury Park mosque and whom a UK court sentenced to life in prison without parole [...] January 2015, has a civil engineering degree. A particularly strong battalion of jihadi VIPs [...] made up of electrical engineers: Muhammad Abdul-Salam Faraj, prominently involved in th[...] Sadat assassination; Pakistani Ramzi Yousef, a leading figure in the first attack on the Wor[...] Trade Center in New York in 1993 who went on to concoct the "Bojinka Plot" with Khal[...] Sheikh Mohammed (himself a mechanical engineer) to simultaneously blow up twelv[...] airplanes in midair between Asia and the United States in 1995; 9/11 support staff Said Bah[...] and Mounir al-Motassadeq; and Yahya Ayyash, Hamas's master bomb-maker in the 1990[...] Computer and electronic engineers include the above-mentioned Abdul Subhan Qureshi [...] Mumbai train-bombing fame, as well as Qatari national Ali Saleh Kahlah al-Marri, for man[...] years the only foreign enemy combatant held on U.S. soil.
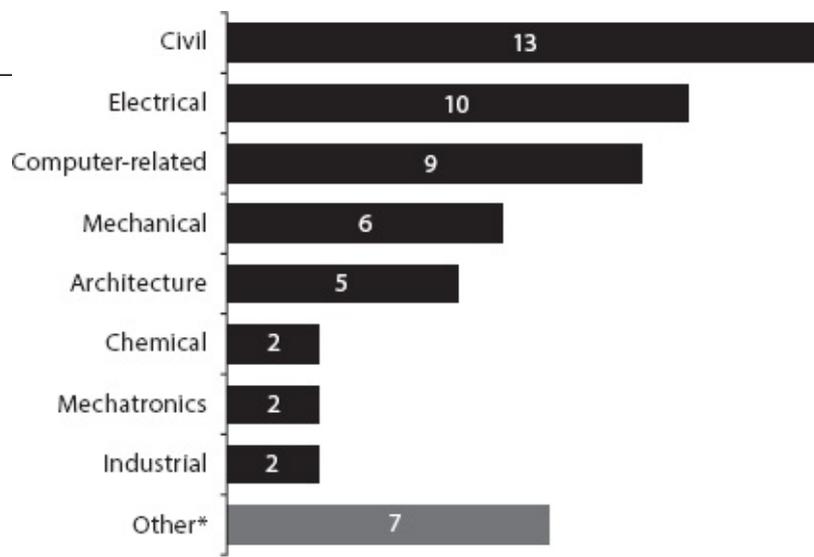
Figure 1.3: Types of engineering disciplines (56 individuals).
    * "Other" includes urban planning, telecommunication electronics, industrial electronics, thermal energy engineering, medical technology, shipbuilding, and aeronautical engineering.
    Source: Muslim world sample.

How Truly Overrepresented Are Engineers?

A bias in reporting the type of degree is implausible: we see no reason why the sources w[e] used should be more inclined to report an engineering degree than any other degree. Still, th[e] high proportion of engineers could be the result of "battlefield" selection: more engineers, w[e] could conjecture, might have fallen into the investigative net, and hence ended up in ou[r] sample, because they took greater risks or had more visible leadership roles. This would b[e] an important finding in its own right: even if engineers did not form a disproportionate sha[re] of jihadists as a whole, they would be the group that played the most significant role and pa[id] the price for it.

    However, this bias is unlikely. We were able to identify individuals who had held [a] leadership function within their militant group and had pursued higher education and fou[nd] that the engineers were no more likely to be in a leadership role than were those who ha[d] studied other subjects at the university level (table 1.1). They were also no more likely to b[e] bomb-makers, as we shall see shortly.[33] These data indicate that engineers are not taking o[n] more exposed roles than are students of other disciplines.

TABLE 1.1
Leaders among Islamist extremists by discipline

Education	Leaders	Total in sample	%
Engineering	38	93	40.9
Medicine	5	8	62.5
Business & Economics	5	12	41.7
Math & Science	7	21	33.3
Islamic studies	19	38	50.0
Other degrees	15	36	41.7
Unknown degrees	5	23	21.7
Total	94	231	40.7

Source: Muslim world sample.

The skeptical reader, however, might remain unconvinced for a different reason. Suppos the extremists come from countries in which scores of youngsters study engineering, common career to aspire to in developing countries. This would then simply be reflected the composition of the extremists. We would still have to explain why there are so man university graduates among the extremists, but the type of degree would simply follow fro the distribution of graduates in the countries of origin. To see whether there is any truth this, we looked at the number of engineers among the extremists relative to the number engineers in the general population and then among the number of university graduate overall.

General Population

The share of engineers among the total male working population in the countries of origin the individuals in our sample, weighted by the number of extremists we identified as comin from each country, is 1.3 percent. By contrast, even if we include all missing cases in th denominator, the share of engineers among our extremists is 18.7 percent (93/497). Thes figures allow us to calculate the ratio between the odds of being an engineer in the gener population and the odds of being one in our sample of extremists. The odds of finding engineer in the sample is *seventeen times greater* than what we would expect if engineers we as likely to radicalize as the male adult population in general.
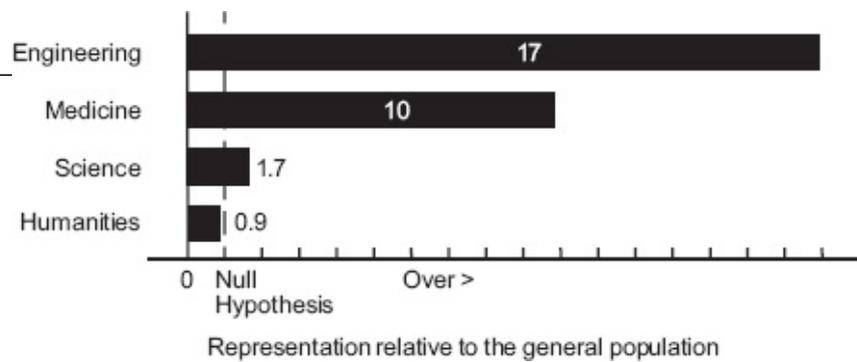
Figure 1.4: Representation of disciplines of study among Islamist extremists relative to presence of the same disciplines in the general population (odds ratio).
Source: Muslim world sample.

Doctors, too, are overrepresented by ten times. The odds of finding scientists, by contra[st] are only slightly higher than what the null hypothesis predicts, while humanities studen[ts] appear slightly less frequently in our sample than they do in the general population.

Population with Higher Education

This massive overrepresentation of engineers among Islamist extremists does not tell us [to] what extent engineers are also overrepresented among the militants with higher educatio[n]. How many engineers could we expect to become radical if they did so at the same rate [as] graduates in any other subject? To address this question we compare our results wi[th] enrollment rates in higher education. Again, the data are for *males*, since all the individua[ls] with higher education in our sample are males with the exception of U.S. citizen Aaf[ia] Siddiqui. We were able to obtain higher education data for all of the countries with [a] substantial number of cases in our sample for 1987, the median year in which the men in o[ur] sample went to university.

As table 1.2 shows, the overrepresentation of engineers in our sample is very pronounce[d] for all nationalities (Saudi Arabia is an exception, which we will explore in the next section[). The average share of engineers among the total number of male students of the 19 countri[es] in our sample is 11.6 percent (individual country averages are weighted by the number [of] men per country in our sample who had pursued higher education). In our sample, b[y] contrast, the share of engineers among those with known higher education is 44.9 percent[.] The odds of being an engineer are more than *six times greater* than we would expect, a resu[lt] that is highly statistically significant. For some of the countries in our sample th[e] overrepresentation is even greater. In Egypt the proportion of engineers among male studen[ts] was 10.9 percent in 1987 (dropping to 8.3 percent by 1995–96),[35] while among the 5[3] Egyptian cases in our sample whose subject of study we know 35.8 percent (19) a[re] engineers. For Palestinians the enrollment rate was 5.9 percent, and out of 62 cases wi[th] known subject of study 35.5 percent (22) are engineers. (The differences between expecte[d] and actual ratios are highly significant for both countries in a chi-square test.)

To be accurate, we have to take into account 40 cases in our sample who studied [in] Western countries, 27 of whom (67.5 percent) studied engineering. To use the overa[ll] engineer ratio in the sample as the term of comparison, therefore, is not entirely correct, [as] Muslims studying in the West might have a higher propensity to choose an elite subject li[ke]

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