Does Education Lead to Pacification?
A Systematic Review of Statistical Studies on
Education and Political Violence

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Abstract

Does more education lead to less political violence, and may education thus be a tool for peace? This article provides the first systematic review of the existing quantitative literature on education and political violence. Looking at arguments pertaining to *levels*, *expansion*, *inequality*, and *content* of education, we identify 42 quantitative studies from the time period 1996–2016 that test the relationship between various measures of education and political violence. An emerging scholarly consensus seems to be that education has a general pacifying effect. However, this general conclusion is challenged by recent evidence showing above-average levels of education among terrorists and genocide perpetrators. This, as well as other findings, underscores that the relationship between education and political violence is complex and multidimensional, depending on type of political violence, mediating factors, and level of analysis. We conclude with policy implications from our findings, and discuss directions for future analysis.

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Does Education Lead to Pacification?
A Systematic Review of Quantitative Studies of Education and Political Violence

Over the last decade, the relationship between education and conflict has attracted increased interest within the media (Paulson & Rappeleye, 2007; Mufti, 2014) and from policymakers and practitioners (UNESCO, 2011, 2015). Scholars within the fields of education, conflict studies, psychology, and other disciplines have also paid increasing attention to this topic (Burde, 2014; Gross & Davies, 2015). One of the most important recent books in conflict studies, Harvard psychologist Steven Pinker's (2011) *The Better Angels of Our Nature,* notes the importance of education in reducing conflict. Pinker highlights 'the escalator of reason' – with education as a central component – as one of the most important 'pacifying forces' of humanity's violent history (see pages 689–691). This view of education is not, however, particularly new. The preamble to the United Nations Educational, Scientific, and Cultural Organization's (UNESCO) 1946 Constitution points directly to education's pacifying power: 'Since wars begin in the minds of men, it is in the minds of men that the defenses of peace must be constructed'.[1]

What evidence is there for the claim that education in the form of formal schooling can positively influence peace? There are surprisingly few conclusive studies on this question. To date, most of the research on education and conflict has been qualitative and inconclusive (Ishiyama & Breuning, 2013). This is for three reasons. First, research on education and armed conflict has been driven primarily by the concerns of practitioners and researchers 'in the field'. Second, there is a lack of comparable international as well as sub-national data on education, and education data is often missing in conflict-affected countries and conflict-affected regions of countries. Third, the relationship between education and

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[1] http://portal.unesco.org/en/ev.php

armed conflict is complex, multi-faceted, and multi-directional, with conflict both shaping education outcomes in both negative and positive ways, and being shaped by education (Barakat & Urdal, 2009:3).

This article provides a systematic review of the existing quantitative literature on education and political violence. We focus on the quantitative literature for two reasons: first, to limit the scope of our inquiry; and second, to try to enhance our ability to compare results across studies – a challenging endeavor given the diversity of quantitative measures, data sources, and variables used across the studies in our sample. We first define our key variables of interest. We then outline the major theoretical propositions in the existing literature on the education-conflict relationship, so as to create an organizing framework for analysis. Subsequently, we discuss the methodology of the review, clarifying key issues in the study of conflict, peace, and education. We provide basic descriptive information about the state of the body of knowledge we have identified.

We find that the existing quantitative evidence converges towards a consensus that education has an overall pacifying effect on conflict. However, these general conclusions are challenged by evidence showing above-average levels of education among terrorists and genocide perpetrators. This, as well as other findings, underscore that the relationship between education and political violence is complex and multidimensional, depending on type of political violence, mediating factors, and level of analysis. We conclude with a discussion of the challenges with existing studies, identify avenues for future research in the field, and offer recommendations for policy and future research. Policy advice emerging from studies of education and political violence is particularly useful since education, unlike many other factors affecting conflict risk, may relatively easily be altered by political action.

Our Key Variables of Interest

The independent variable in our review is *education*, defined as formal[2] schooling: teaching

and learning that takes place in specially constructed buildings for a certain number of hours

a day, over the course of many days during a year (Giddens, 2001; King, 2005; Ramirez &

Boli, 1987). We do not address informal and non-formal schooling, or special curricular add-

ons such as peace education. Our dependent variable is *political violence*. While we are

primarily concerned with civil conflict, we also investigate other forms of politically-

motivated group violence, including genocide, inter-communal violence, riots, protests,

urban violence, and terrorism. We explain the rationale behind this at the end of the section

below outlining our theoretical framework as well as in the methods section.

Theoretical Framework: Education's Impact on Conflict

Although all the studies included in this review are quantitative, they employ different

independent and dependent variables, geographic areas, timeframes, and units of analysis.

These methodological differences make it impossible to statistically compare the findings of

the various studies to each other. Instead, we organize our analysis around the theoretical

arguments that have been put forward (and in some cases, tested) in the various studies to

explain a potential relationship between education and political violence. As a way of

systematizing the different theoretical propositions presented in the literature we find it

useful to distinguish between arguments relating to *levels*, *expansion*, *inequality*, and *content*

of education.

Education Levels and Conflict.

Most of the arguments presented in the literature on education and conflict pertain to levels

of education, or government investment in education. By levels, we mean two things: one,

the aggregate amounts of schooling that individuals have; and two, the actual cut-off points

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[2] Formal education may be provided by both public and private actors, including religious
actors.

in the education system (primary, lower and upper secondary, tertiary). What these propositions have in common (with few exceptions) is that higher levels of education foster peace. This could be for one of three reasons: First, there are larger numbers of people in the system and government education expenditures are higher. Second, there are larger numbers of individuals with more years of schooling attained, raising the opportunity costs of engaging in violence. Third, greater levels of schooling signal that more people have received state-sanctioned curricular content, and thus normative ideas about the value of conflict may have changed. The first two explanations of grievance and opportunity costs took off with Collier and Hoeffler's (2004) greed-grievance debate on the individual motivations for joining rebel movements. These authors argued that low education achievement reduces the availability of alternative economic opportunities and increases the attractiveness of joining a rebellion as a source of income. Alternatively, low education levels can spur feelings of injustice among excluded groups of young people who engage in political violence to redress grievances, including over the failure to access schooling.

Education levels can have both a direct and indirect effect on the grievances that may foment political violence. First, so-called relative deprivation theories posit that grievances arise when the gap between people's expectations and their actual situations worsens (Gurr, 1970). Second, government investment in education signals that it cares about the well-being of citizens, and higher spending entails that governments can make a direct and lasting positive impact on people's lives, directly reducing the level of grievances in society (Aoki et al., 2002). Third, education spending can indirectly reduce societal grievances and hence conflict by spurring economic development and social equality (Thyne 2006).[3]

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[3] Critics of the government investment argument have argued that educational expenditures may often be distributed unequally to the university level, which disproportionately favors the wealthy in society. Furthermore, spending measures may show false responsiveness if funds get trapped in bureaucratic inefficiency or corruption. For this reason, Thyne (2006)

In the strand of the civil war literature focusing on the economic causes of war, education is framed as a factor affecting the opportunity cost of conflict (e.g. Collier & Hoeffler, 2004). Such factors relate to the structural conditions that may facilitate a rebel group's war against a state, of which an important aspect is the cost of rebel recruitment. Soldiers must be paid, and the cost of recruiting is related to their income forgone by enlisting as rebels. Greater levels of educational attainment increase the opportunity cost of young people joining conflict[4], making rebel recruitment more costly and rebellion less likely (ibid; see also Kuhn & Weidmann 2015; Lochner & Moretti, 2004). According to Collier and Hoeffler (2004), the implication of this is that policy makers should focus on male secondary school enrollment, since young men are the group from which most rebels are recruited. Following this logic, Barakat and Urdal (2009) argue that in countries with large potential pools of rebel recruits due to large young male cohorts, increasing education at any level will help reduce this pool considerably.

A third explanation for the pacifying effect of education levels is the creation of social and political stability through transmission of norms and preferences around the use of violence. Aristotle argued that education promotes a culture of peace – a collective preference for the non-violent resolution of conflicts (Sargent, 1996). Lipset (1959: 79) noted that 'education presumably broadens men's outlook, enables them to understand the needs for norms of tolerance, restraining them from adhering to extremist and monistic doctrines'. In line with this, several scholars argue that higher educational attainment

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warns that increased educational expenditures could actually lead to more social unrest if they intensify existing inequalities, particularly in very poor societies. As an alternative indicator of reduced grievances, he suggests that one focus on primary education enrollment, which arguably better captures how government investment in education actually reaches those who need it most.

[4] Barakat and Urdal (2009: 4) note that for the relatively small number of 'conflict entrepreneurs', a higher level of education may actually lead to higher rewards due to more efficient management of illicit trade or similar activities.

(levels) reduces the risk of political violence by encouraging political participation and the channeling of conflicts of interest through institutional pathways rather than through the use of violence (e.g. Alesina & Perotti, 1996; Hegre, 2003; Hibbs, 1973; Huntington, 1968).[5] More recently, scholars have argued that education promotes social cohesion through learning how to work together peacefully, which in turn enables socioeconomic stability. Kuhn and Weidmann (2015) point out that public opinion and communication research has shown that "beliefs of less-knowledgeable and less-informed individuals are more susceptible to rhetoric, propaganda, and indoctrination" (p. 552). In this respect, Thyne (2006) points out that indicators of adult education, such as secondary and tertiary enrollment, as well as adult literacy, should be of special relevance, as they indicate whether a government is able to provide an arena for the fostering of social cohesion among the individuals that are most likely to rebel against the state.

Educational Expansion and Conflict.

As argued above, the opportunity literature suggests that education is generally expected to increase the opportunity cost of rebel recruitment, which in turn reduces the likelihood of rebellion. This is not incompatible with the motive-oriented literature that focuses on the potential for violent conflict arising from grievances caused by lacking education. As argued above, high rates of enrollments at all levels of education could be expected to be associated with lower risks of conflict. However, Huntington (1968: 47) argued that rapid expansion of education could increase the risk of political instability, and that 'the higher the level of education of the unemployed, the more extreme the destabilizing behavior which results'. Likewise, Davies (1962) also argued that violence could result from expanded education that

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[5] Hanf and Bauerle (2009) found in a study of survey data in 10 countries that there is a robust, positive relationship between high education levels and democratic attitudes on the individual level. A similar effect is documented by Chong & Gradstein (2015) studying cross-national data from the World Values Survey.

does not meet the rising economic expectations fueled by that expansion. This argument is

not about a static stock measure of individual achievement within the education system but

rather reflects a measure of flow – that is, the rate of change in access to the education, and

how change within the system impacts individual expectations about life outcomes.

When countries respond to large youth cohorts by rapidly expanding access to higher

education, this may produce a much larger group of highly educated young people than the

labor market is able to absorb (Urdal, 2006). Prevailing unemployment among highly

educated youth segments may cause frustration and grievances that could motivate political

action, including violence. According to Choucri (1974: 74), high unemployment among

educated youth is one of the most destabilizing and potentially violent sociopolitical

phenomena in any regime. Concurring with this, Goldstone (2001: 95) notes that rapid

increase in the amount of educated youths has preceded historical episodes of political

upheaval. Lia (2005) has argued that the expansion of higher education in many countries in

the Middle East has produced large masses of unemployed and easily mobilizable youths,

which has had a radicalizing effect and provided new recruits to militant organizations (see

also Campante & Chor, 2012 on the Arab Spring). An important policy question arising

from this discussion is how countries are best advised to expand educational opportunities in

order to avoid instability.

Education Inequality and Conflict.

Socioeconomic inequality is among the factors frequently used to measure grievances, and is

often seen as giving rise to conflict. Ferranti, Perry, Ferreira, and Walton (2004) argue that

education is in fact the main driver of socioeconomic inequality in a society since education

plays a strong role in determining future life opportunities and trajectories. In the inequality-

conflict literature, there has been much discussion about the significance of two types of

inequality. The first pertains to inequality between individuals (or so-called *vertical*

inequality), and the other type pertains to systematic inequalities between ethnic, linguistic, religious, or regional groups (so-called *horizontal inequality*). General theories of relative deprivation posit that whereas absolute poverty may lead to apathy and inactivity, comparisons with other individuals or groups in the same society who do better may inspire radical action and even violence (Gurr, 1970). In contrast to the education levels argument, wherein individuals mobilize because of the overall lack of education in society, an inequalities argument stresses that individuals mobilize because of perceived and unjustified differences between themselves and others. It is the nature of the distribution of education (its unevenness) and individuals' comparative understanding of whether and how they benefit relative to others around them, as opposed to the presence or absence of education overall, that serves as a call to arms. In other words, education inequality-based mobilization is about equity rather than equality.

Horizontal inequality scholars argue that group-based inequalities are most likely to result in political violence since civil conflicts are inter-group conflicts, not isolated cases of random violence between individuals (see Østby, 2008). In short, the argument is that socioeconomic or political inequalities that coincide with identity cleavages in society can enhance group grievances and thus facilitate mobilization for conflict. Governments often implement discriminatory schooling policies that disadvantage minority groups, a tradition rooted in colonial practice (de Soysa & Wagner, 2003). For example, state expenditure on education per white student in apartheid-era South Africa was 14 times the expenditure per black student (Stewart, 2002: 24). Similar practices occurred in states like Sri Lanka and Rwanda. Horizontal inequalities in education access are arguably a particularly important form of inequality since they automatically lead to other forms of horizontal inequalities, such as income, employment, nutrition, health as well as political positions (Johnson & Stewart, 2007).

Ethnicity is not the only basis on which educational opportunities may be unevenly distributed. Gender is also a dividing marker, and gendered education inequalities can influence peace and conflict in two ways. First, Bussmann (2010) argues that gender equality in education indirectly leads to peace through the promotion of development and good governance. Second, most explanations for the relative peacefulness of societies with greater gender equality refer to the general pacifism of women as a result of either nature or socialization (ibid). Such societies may be more peaceful due to the norms of respect and inviolability that characterize close relations between individuals, which are also expected to carry over to more distant relations, thereby strengthening societal norms that reject abuse and violence (Melander, 2005).

Content of Education and Conflict.

Finally, some of the education-conflict literature is concerned with the quality of education, in particular the content of the curriculum. Expanding access to education of relatively low quality may worsen the ability of individuals to translate schooling into employment opportunities (especially in the private sector). This has particularly been noted with reference to the Middle East (Salehi-Isfahani, 2008).

The education system may also serve as a major agent for socialization for conflict through textbooks, teachers' instructions, and school ceremonies (Bar-Tal & Rosen, 2009). Davies (2004, 2005) distinguishes between three potentially conflict-inducing socialization mechanisms. First, education can (re)produce economic and class relations by excluding (already) marginalized groups in the curriculum and other school-based practices. Second, schools can reproduce existing violent masculine gender relationships and positively reinforcing the use violence more generally. Finally, education can transmit or reinforce identities based on ethnicity, religion, tribalism and nationalism, and it can also be used as a means of indoctrination, fueling militarism and violent religious extremism, increasing the

probability of civil conflict (Thyne, 2006: 738). Berrebi (2007) warns that educational content advocating particular political or religious messages can increase an individual's propensity to join militant organizations. Such extremist education might on the one hand encourage radical thought while only on the margin increase productive opportunities in the labor market.

Education and Different Forms of Political Violence.

While many of the studies on education and political violence have addressed civil conflict, this review also includes studies that look at other forms of political violence, such as genocide, inter-communal violence, riots, protests, urban violence, and terrorism. There has been some discussion over whether expansions in higher levels of education may be particularly relevant for low-intensity violence such as riots (e.g. Urdal, 2006). Another important distinction is between civil conflict and terrorism.[6] As described above, the theoretical contributions concerning the effects of education on civil conflict assume an overall negative influence of education. The literature on the economics of crime also suggests that a lack of education is connected to illegal activities. Although terrorism seems akin to crime, this literature does not yield a clear answer to whether more education would reduce recruitment to terrorism (Krueger & Malečkova, 2003). Berrebi (2007: 7–9) provides a number of theoretical considerations and speculations as to why increasing education could actually lead to *greater* risk of terrorism. Inter alia, he points to the potential importance of educational content (such as extremist religious teachings), reasoning skills (which for instance can make individuals more aware of social injustice), contextual factors (including limited economic opportunities), and finally the selection of terrorists by terrorist organizations. The latter argument was originally formulated by Bueno de Mesquita (2005),

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[6] See e.g. Sambanis (2005: 169–172) for an overview of the differences between terrorism and civil conflict.

who developed a theoretical model positing that terrorist organizations are likely to screen

the pool of potential members and select the better-educated individuals among them.

Method

The protocol described in the following was designed to guide a systematic review to

address the following research question: What is the impact of education on political

violence? Review questions are often best defined together with potential users, and this

question was formulated after discussions with UNESCO, who in 2010 commissioned us to

write a background paper on the quantitative evidence on the education-conflict relationship.

As a way of systematizing the different theoretical propositions presented in the literature we

find it useful to distinguish between arguments relating to *levels*, *expansion*, *inequality*

(between individuals and identity groups), and *content* of education.

Our review includes publications that have addressed several studies of other forms

of collective, politically motivated violence**,** including demonstrations, riots, terrorism,

communal conflict, and civil war. We are particularly interested in the effect of education on

the risk of 'internal armed conflict' or 'civil war' as this form of warfare has predominated

globally since the end of the Cold War. Such conflicts are typically understood to involve

two organized parties of which one is the government of a state, causing a certain minimum

of battle-related deaths (typically at least 25 deaths to be considered an armed conflict and

1,000 to qualify as a 'civil war') per year (Gleditsch et al., 2002).

Scope

The main inclusion criteria for selecting potential candidates for the review are the

following:

1) Time span: 1990–2016
2) Language: English
3) Format: Published article, review, proceedings, working paper, report, or book
   chapter

Literature search

We consulted the following databases: ISI Web of Science and Google Scholar. A clear

challenge is related to the general lack of obvious standardized search terms to use in order

to locate quantitative studies of political violence that include measures of education even

when education as such is not part of the main argument in an article.

ISI advanced search string:

(TI=(war* OR conflict* OR violen* OR terroris* OR genocid* OR unrest* OR insurgen*
OR security* OR peace*) AND TI=(educat* OR schooling*))

Refined by: DOCUMENT TYPES=(ARTICLE OR PROCEEDINGS PAPER OR REVIEW
OR BOOK CHAPTER)

LANGUAGE: English; Timespan=1990-2016. Indexes=SSCI.

This search yielded 1166 titles.

Screening

After the completion of the literature search the 1166 titles were screened for eligibility

according to the following exclusion criteria:

1. Titles which excluded the potential for a quantitative study
2. Titles which excluded the possibility of some kind of peace/conflict as the dependent
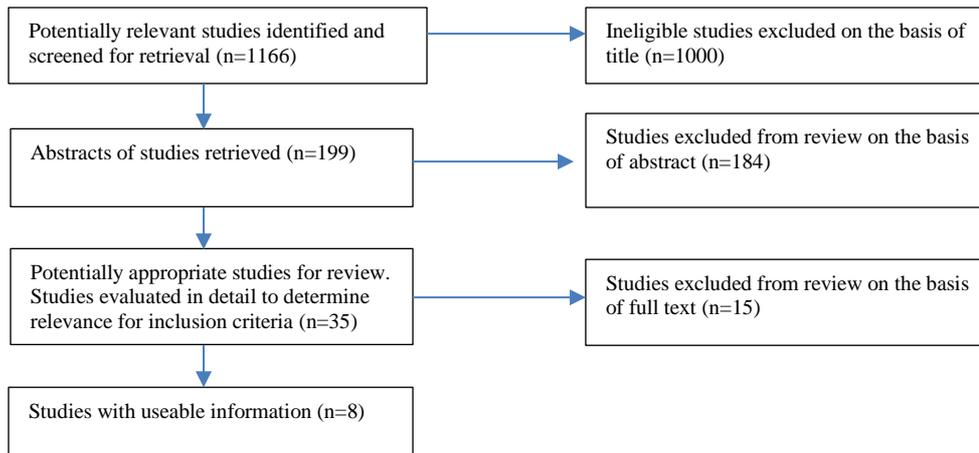   variable

   By these criteria we ended up with 199 titles. For these titles the *abstracts* were

screened for eligibility according to the following exclusion criteria:

1. Abstracts which excluded the potential for a quantitative study
2. Abstracts which excluded the possibility of some kind of peace/conflict as the
   dependent variable
3. Abstracts which excluded the possibility of some kind of education as independent-
   or control variable

By these criteria we ended up with 12 titles. For these titles the *full text articles* were

screened for eligibility according to the following inclusion criteria:

1. Some kind of statistical/quantitative analysis
2. Some kind of peace/conflict as the dependent variable
3. Some kind of education as independent- or control variable

By these criteria we ended up with eight core titles.

Quorum Flowchart

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┌─────────────────────────────────┐        ┌─────────────────────────────────┐
│ Potentially relevant studies    │───────▶│ Ineligible studies excluded on  │
│ identified and screened for     │        │ the basis of title (n=1000)     │
│ retrieval (n=1166)              │        │                                 │
└─────────────────────────────────┘        └─────────────────────────────────┘
              │
              ▼
┌─────────────────────────────────┐        ┌─────────────────────────────────┐
│ Abstracts of studies retrieved  │───────▶│ Studies excluded from review on │
│ (n=199)                         │        │ the basis of abstract (n=184)   │
└─────────────────────────────────┘        └─────────────────────────────────┘
              │
              ▼
┌─────────────────────────────────┐        ┌─────────────────────────────────┐
│ Potentially appropriate studies │───────▶│ Studies excluded from review on │
│ for review. Studies evaluated   │        │ the basis of full text (n=15)   │
│ in detail to determine relevance│        │                                 │
│ for inclusion criteria (n=35)   │        │                                 │
└─────────────────────────────────┘        └─────────────────────────────────┘
              │
              ▼
┌─────────────────────────────────┐
│ Studies with useable information │
│ (n=8)                           │
└─────────────────────────────────┘
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The titles below are the eight studies we refer to in the final box of our flow chart as being most relevant to our study: Bartusevičius (2014); Brockhoff et al. (2015); Elbakidze and Jin (2015); Ishiyama and Breuning (2012); Krueger and Malečkova (2003); Lee (2011); Oyefusi (2010); and Thyne (2006).

These 8 main titles were supplemented with two additional forms of searching strategies:

1. 'Snowballing': Browsing the reference list of the eight key contributions, and of the works identified from these new references
2. 'Pearl growing': Searching for articles which themselves cite a key reference o Google scholar

Finally, the search was widened with additional searches on *Google scholar*, with similar search words as the ones in ISI. The intention of this was to be better able to identify the so-called 'gray literature' in this field (i.e. literature that is not obtainable through normal publishing channels, including unpublished working papers), as well as quantitative studies on political violence that treated some kind of education measure as a control variable although education was not a main topic of the study.

In summary, the references in our sample met the following criteria:

- They engage in quantitative analysis;

- They examine some measure of political violence as the dependent variable, and

- They include at least one measure of education in the empirical analysis as an independent variable.

Following the approach described above, we were able to identify a total of 42 quantitative studies that address the relationship between education and political violence. Table 1 provides an overview of all these studies, including information about level of analysis (separating between cross-national macro-level studies, single-country regional- or meso-level studies, and individual- or micro-level studies). The table further provides key information about the spatio-temporal domain, the key dependent and independent variables, and summarizes the key findings.

– Table 1 Here –

Basic descriptive analysis

What became clear from this exercise was first of all that the quantitative literature on education and conflict is a relatively new field, with the majority of the publications emerging only since the turn of the millennium. In a review article assessing the early quantitative civil war literature, Sambanis (2002) mentions education only briefly under the heading 'poverty and slow economic growth', making reference to only one study, an early working paper version of Collier and Hoeffler (2004). In a subsequent review article on the relationship between poverty and political violence, Sambanis (2005: 184) concluded that 'there is not a wealth of quantitative results on education to discuss'. In fact, among all the 42 studies reviewed herein only seven studies predate Sambanis' (2005) article.

Most of the studies presented here typically include one education measure among a large number of explanatory variables. To date, only a few systematic quantitative conflict studies have had education as the primary focus, notably the works by Barakat and Urdal (2009); Brockhoff, Krieger and Meierrieks (2016); Canavire-Bacarreza, Jetter, and Montoya-Agudelo (2016); Krueger and Malečkova (2003); Lange (2012); Omoeva and Bucker (2015); and Thyne (2006). Only 15 out of the 42 studies presented in this review have the word

'education' as a part of the title (Barakat & Urdal; 2009; Bartusevičius 2014; Berrebi, 2007;

Brockhoff, Krieger & Meierrieks, 2016; Canavire-Bacarreza, Jetter & Montoya-Agudelo,

2016; Elbakidze & Jin, 2015; Fair, 2008; Ishiyama & Breuning, 2012; Krueger &

Malečkova, 2003; Lange, 2012; Lee, 2011; Omoeva & Buckner 2015; Oyefusi, 2010; Shayo,

2007; and Thyne, 2006). Among these, the vast majority are micro-level studies, which will

be further discussed towards the end of this section. Of the 42 reviewed studies, 22 are

macro-level (cross-country) studies, 9 meso-level (sub-national) studies (of which most are

single country studies), 10 are micro-level (individual-level) studies, while one study

presents both macro-and micro-level evidence (Shayo, 2007).

33 articles in our sample are either cross-country (macro-level) or sub-national

(meso-level) studies.[7] The latter category includes works that analyze the link between

education and conflict at the sub-national (e.g. regional, or city) level. A handful of studies

are at the micro-level and link individual involvement in political conflict to a person's

educational level. While the majority of the macro-and meso-level studies focus on the

conflict potential of various levels of education, there are also quite a few studies which

examine the impact of some kind of inequality in educational opportunities across social

groups. Only three studies consider the impact of educational expansion, and none of the

studies examine the effect of educational content or quality.

Data, Measurement and Methodological Issues

Several different measures capturing various aspects of education are used in the studies

included in this review. We divide them between measures of access and quality. Measures

of access include literacy rates, enrollment, attainment, and government expenditure – all

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[7] A large majority of these studies focus on the influence of education on civil conflict, but there are also examples of studies that examine terrorism (Urdal, 2006); riots (Urdal, 2006; 2008); urban social disorder (Urdal & Hoelscher, 2009); ethno-communal violence (Mancini, 2008); and other forms of political violence (Barron, Kaiser & Pradhan, 2004; Tadjoeddin & Murshed, 2007).

proxies for the coverage of the formal schooling system. The most basic measure is the

proportion of literates in the adult population, or in some specific age group (typically young

adults). This rather crude measure is sometimes used to proxy variation in development

level (e.g. Urdal, 2008). Further, several conflict studies use measures of education levels

(i.e. the average number of years in school, or the proportion of the population having

completed a certain level of education), using either data on educational *enrollment*

(primary, secondary, and/or tertiary) by relevant age groups, or on *attainment* to measure the

number of years of formal schooling that given age groups have completed. Another

measure, *government expenditure on education*, estimates the amount of money that

governments spend on the formal education sector.

Some studies have helpfully disaggregated education access data by gender, age, and

social group. While enrollment rates have been widely used in this respect, a dataset

compiled by researchers at the International Institute for Applied Systems Analysis (IIASA)

(Lutz, Goujon, Samir & Sanderson, 2007) provides educational attainment data by gender

and age for 120 countries for the period 1970–2000. The dataset is based on individual-level

educational attainment data from Demographic and Health Surveys (DHS) and national

censuses that have been back-projected using multi-state demographic modeling. UNICEF

has also supported the creation of the Education Inequality and Conflict Dataset as well as

the Subnational Education Inequality and Conflict Dataset (see Omoeva & Buckner 2015).

This detailed kind of data also allows for the calculation of educational progression rates

from one level to the next as well as measures of expansion in access to education between

succeeding cohorts (Barakat & Urdal, 2009). Several studies included in this review further

separate between education in men and women, which we discuss in more detail in the

review of the empirical evidence. For other types of social groups, DHS data can be used to

construct measures of educational inequalities between ethnic, religious or regional groups

(Østby, 2008). Finally, some studies use a measure of education spending relative to income levels to capture government responsiveness (e.g. Thyne, 2006).

Data is available on educational quality, measured as either learning outcomes in the form of standardized test scores for nation-wide tests (e.g. Dahlum & Knutsen, 2017; see also Verwimp, 2016) or inputs (such as materials and teachers). Data on education quality is available for much of sub-Saharan Africa in the form of the 'Southern and Eastern Africa Consortium for Monitoring Educational Quality' (SACMEQ) and Programme d'Analyse des Systèmes Educatifs de la CONFEMEN (PASEC) datasets. Weidmann et al., (2016) measure inequality in access to the internet (finding political bias in provision across ethnic groups), which could potentially be used as a proxy for education quality. However, data on quality often do not exist for the most conflict-affected areas, and we are not aware of any quantitative data on other measures of quality, including curricular content or the language of instruction. We are not aware of any cross-sectional studies that have attempted to systematically look at the relationship between quality or content of education and conflict. The relationship between education quality and conflict thus merits more attention.

Education is sometimes treated as a proxy for development, meaning that it is used as an indicator of the general level of development in society (e.g. Urdal, 2008). However, both Thyne (2006) and Barakat and Urdal (2009) demonstrate that education indeed has a pacifying effect even after controlling for income level, and it is therefore likely that education has an independent impact on peace, rather than working indirectly through, or in combination with, other mechanisms.

Many of the studies included in this review address the effect of education on the risk of 'internal armed conflict' or 'civil war'. Such conflicts are typically understood to involve two organized parties of which one is the government of a state, causing a certain minimum of battle-related deaths (typically at least 25 deaths to be considered an armed conflict and

1,000 to qualify as a 'civil war') per year (Gleditsch, Wallensteen, Eriksson, Sollenberg, & Strand, 2002). However, this review also includes several studies of other forms of political violence, such as communal (inter-ethnic) conflict, urban violence, genocide, and terrorism.[8] Throughout the article, we use various terms interchangeably to denote large-scale organized violence with political aims: *political violence, armed conflict, civil conflict, conflict,* and *rebellion.*

Table 1 does not include a detailed overview of the heterogenous methodological designs nor the various other variable included in the respective analyses due to space and legibility concerns as the variety across studies is significant. The macro and meso-level studies are most commonly employing forms of logistic regression for cross-sectional panel data with binary dependent variables (e.g. conflict onset), or negative binomial or Poisson regression in event count models. The majority of micro-level studies use multinomial regression models. As for the model setup, cross-national studies typically include controls like development level (commonly income or infant mortality), democracy, total population size, ethnic or religious heterogeneity, and past conflict, while in meso-level analyses, the controls typically include wealth or income, population size, distance to other conflict events, and ethnicity variables. Individual-level analyses most commonly include age, gender, income, employment status, marital status, and urban/rural residence.

Concerns may be raised over the representativeness of the findings, and hence the external validity of the results summarized here. This concern is less valid for the cross-national studies, where the vast majority – 18 out of 22 – include global samples of states in all regions of the world. Four of the cross-national studies include primarily developing

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[8] In this review we exclusively consider the impact of education on conflict. For an overview of the reverse causal relationship, i.e. the effects of conflict on education, see e.g. Blattman and Miguel (2010) and Lai and Thyne (2007).

countries, two include primarily relatively developed states, while the remaining three are regional studies. Single-country meso-level studies are on the other hand highly skewed geographically, with all five being of Asian countries, of which three are from Indonesia. The micro-level studies have primarily been done in Sub-Saharan Africa and the Middle East (all three on Palestine), with one study each from Latin America, Asia and Europe. Generally, the Middle East and North Africa is the region, while included as such in most cross-national studies, is probably least well represented as high-quality education attainment data is relatively scarcer for many countries in the region (Barakat and Urdal, 2009).

Level of Analysis.

There are good reasons to consider separately the effect of education at different levels of analysis. Cross-national measures of education quite often mask significant regional variation, opening the question of whether conflict occurs in the most or least educated areas of a country. Furthermore, drawing conclusions about the behavior of individuals based on aggregate statistics represents the potential for committing an ecological fallacy: we cannot automatically infer from a cross-national relationship between low education and conflict that those who take part in the violence are the least educated.   In the later sections where we review the empirical evidence base, we discuss the existing macro-level (cross-national) and meso-level (sub-national) evidence on the education–conflict nexus, before moving on to discuss the findings of works that rely on micro (individual)-level evidence capturing individual background characteristics among actual participants in political violence.

Establishing Causal Inference?

Establishing evidence for a causal relationship, and not merely a correlational relationship is challenging, and as demonstrated by Blattman and Miguel (2010), de Groot and Göksel

(2011), and Lai and Thyne (2007), armed conflict may also impact education. Although precise statistics on the effect of conflict on education are difficult to find, it seems clear that the impact can be considerable (Novelli & Cardoso, 2008). This raises concerns about endogeneity: to what extent can we be certain that the relationship between low and unequal education and conflict is not simply reflecting the opposite causal direction, namely that conflict can lead to disruption and discrimination in the provision of education?

Similar concerns about *endogeneity* or reverse causality exist for many other relationships in the civil war literature, including between development and conflict, economic growth and conflict, regime type and conflict, and ethnic fractionalization and conflict. These concerns are real and have to be addressed properly. Studies of conflict onset typically address this problem by lagging the explanatory variables so that conflict onsets in a given year are explained by the values on the explanatory variables in the previous year. The purpose of this procedure is to avoid any influence of conflict on the explanatory variables.[9] An additional point is that educational measures capturing the level of education, such as educational attainment, whether on individual or group level, are not likely to be strongly affected by conflict in a short to medium time frame. Significant declines or inequalities in access are likely to result from long-lasting and high-intensity conflict. Measures of enrollment, or of education change, are likely to be more susceptible to conflict influence. Studies typically also include extensive controls for potentially confounding variables, such as democracy which may be expected to affect both education *and* conflict.

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[9] However, this is complicated by the handling of recurring conflicts. In most studies, a period of conflict inactivity, typically two to five years, is required before a new onset of the same conflict is coded. Hence, 'conflict legacy' may have some influence on the explanatory variables for recurring conflicts. As Thyne (2006) points out, an added endogeneity problem is that people may act upon the anticipation of fighting, for instance fleeing before a conflict breaks out. This would not necessarily be captured by a lagged data structure.

While the vast majority of studies included use conventional correlational designs, two of the studies include stronger designs. Thyne (2006) tests specifically for endogeneity by running a two-stage model where the first stage involves predicting education and other possible endogenous variables. Then, the residuals from the first stage are run in a basic civil war model, finding strong support for the exogeneity of his education variables. The same conclusion is reached by Brockhoff et al. (2013) controlling for endogeneity using a two-step Hausman-type procedure in a study of terrorism. Hence, the two studies conclude that the statistical relationships are not driven by the reverse causal influence of conflict and terrorism on education.

An increasing number of studies uses experimental approaches to study the impact of education on attitudes towards violence. An example is Friedman, Kremer, Miguel, and Thornton (2015) studying the effect of participating in a merit scholarship program for girls in Kenya through a randomized control trial (RCT), finding that increased education was linked to increased rejection of political authority and greater acceptance for the use of political violence. While such approach in many respects represent a 'gold standard' for establishing causal inference, experimental designs are not easily transferable to studies of political violent actions. Consequently, neither of the studies in the sample employ RCTs, however both Pugel (2008) and Humphreys and Weinstein (2007) use quasi-experimental designs in their studies of reintegration programs for rebel soldiers.

Results

In this section we review the evidence base for each of the theoretical propositions discussed above relating to levels, expansion, inequalities, and content of education.

Higher Levels of Education Are Linked to Peace

Table 2 summarizes the main evidence on the broad links between education levels access (amounts) and conflict, distinguishing between the individual impacts of six different

education access indicators: enrollment (primary, secondary, and tertiary); attainment (years of schooling); literacy; and government expenditure.

– Table 2 Here –

A quick look at Table 2 yields some immediate observations. First of all, there seems to be broad empirical evidence of a general negative relationship between the levels (amount) of education and conflict. In other words, there is good reason to believe that countries with higher average levels of education in the population have a lower risk of experiencing armed conflict. This corresponds to observations in the qualitative case study literature, which generally seem to suggest that poor access to education explains participation in civil conflict. One example is Brett and Specht's (2004) interviews with child soldiers, which have produced strong micro-level support for the expectation that a lack of schooling in addition to poverty, and few or no alternative income opportunities, are important reasons for joining a rebel group.

A second observation is that education access has been measured in several ways in quantitative conflict studies, but the most common indicator seems to be some variant of secondary education (either for males or for both genders).[10] This is in line with Barakat and Urdal (2009: 12), who found secondary education attainment to provide the most suitable discriminator in assessing the role of education in conflict. For secondary education, the results seem to point in the same direction of greater numbers of individuals with secondary education resulting in reduced conflict risk, with only one exception.[11]

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[10] One exception to this is Taydas and Peksen (2012), who combine government education expenditure with health and social security expenditures to create a welfare spending variable that they use to predict conflict onset. We do not include this study in our review since it fails to test for the independent effect of government education spending on conflict.

[11] Surprisingly, Bussman (2010) is not able to replicate the negative relationship between secondary education enrollment and conflict risk, although her conflict data stem from the PRIO/Uppsala Armed Conflict Dataset which is also used by e.g. Barakat and Urdal (2009)

Judging from the results summarized in Table 2, it is further unclear whether tertiary education is related to conflict risk. In what is perhaps the most comprehensive account of education and conflict to date, Thyne (2006) does not report any significant effect of tertiary education on conflict. Disaggregating civil conflict into three sub-types, Besançon (2005) found that higher tertiary education levels in the population increase the risk of ethnic wars and genocides, whereas they lower the risk of revolutions. Bussmann (2010) found that tertiary education has an overall pacifying effect. So did Ishiyama and Breuning (2012), who focus on conflict recurrence. These authors found that increases in tertiary education enrollment within the first five years after the end of a conflict reduces the likelihood of conflict recurrence, whereas primary and secondary education provision is not found to have any significant effect on such peace duration. Finally, although Hillesund (2015) found no evidence that higher education inequalities result in more acceptance of violent protests, she pointed to several possible reasons for her non-finding in the Palestine case, notably the limited variation between regions as well as data validity questions, that do not necessarily translate to other contexts.

The effects of education become less clear when we move from cross-national evidence to sub-national evidence from single countries (Barron, Kaiser, & Pradhan, 2004 and Tadjoeddin & Murshed, 2007 on Indonesia; and Urdal, 2008 on India). Tadjoeddin and Murshed (2007) did not find a linear relationship between average years of schooling received and the risk of what they refer to as everyday 'routine' violence in Indonesian

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and Hegre (2003). Secondary enrollment has the expected negative coefficient in her model, but the effect is not statistically significant. This may be a statistical artifact, especially as she finds negative and statistically significant effects of both primary and tertiary education. While the robustness of this finding may only be fully assessed through a proper replication of the study, it may be that the non-result is driven by the more restricted spatio-temporal domain (16 years of observations, 100 countries) compared to many of the comparable cross-national studies. Bussmann also studies education enrollment, which arguably is a less ideal measure than education attainment.

districts between 1994–2003. Rather, the relationship appears to be an inverted U-shape: violence increases as education rises, but, later on, the level of violence falls as education continues to increase. This finding potentially reflects an increasing potential for political mobilization, including for organized violence, as individuals and groups progress from little or no education, while at considerably higher levels of education a peace dividend is reached as a result of increased opportunity cost.

The two studies that examine the effect of education levels on multiple types of conflict (Besancon, 2005 on ethnic wars, genocides, and revolutions; and Urdal, 2008 on armed conflict, political violence and Hindu-Muslim riots in India) further indicate that education does not necessarily have the same calming effect on all kinds of conflict.

What Table 2 does *not* reveal is the impact of various contextual factors on the link between education and conflict. For example, Barakat and Urdal (2009) found that low rates of male secondary education are more likely to cause conflict in societies with large young male population bulges, particularly in poor countries, and particularly in Sub-Saharan Africa. Furthermore, Barakat and Urdal (2009) found some evidence indicating that the presence of large youth cohorts with low education attainment increases the risk of conflict the higher the country's dependence on rich natural resources. Hegre (2003) found that the impact of education level (measured as literacy rates) on conflict may be mediated by regime type. More specifically, he found that the risk of armed conflict decreases with increasing literacy for democracies, but not for other (non-democratic) regimes.   Lange (2012) produces similar findings in his study of education and ethnic violence, showing that low-income countries with dysfunctional political institutions and low education attainment (particularly secondary school completion) face a high risk for experiencing violence.

Taken together, the empirical evidence presented above supports each of the theoretical propositions presented earlier regarding the effect of education on conflict:

grievances, opportunity-costs, and social cohesion and stability. It is not possible to distinguish the explanatory power of each of these theories in the absence of micro-level data that could reveal motivations. The general finding that countries with higher levels of secondary educational enrollment in the population have smaller risks of conflict could be explained both in terms of reduced opportunity costs of rebel recruits, or in terms of reduced grievances among young people (and males in particular). As we see below, individual-level studies have so far not been able to settle this issue.

No Threat from Expanding Tertiary Education

Four studies in our sample have tested the violence potential of rapid expansions in tertiary (higher) education, of which two are cross-national studies, one is a dyadic study of conflict recurrence, and the third is conducted at the city-level. Barakat and Urdal (2009) focus on the effect of expansions in tertiary education on civil conflict; Urdal (2006) analyze the impact on both armed conflict, terrorism, and riots; Ishiyama and Breuning (2012) study the effect of increases in tertiary education; whereas Urdal and Hoelscher (2009) study the impact of expansions in higher education on the levels of lethal and non-lethal urban social disturbances in 55 large cities in Asia and Africa. According to these joint findings, expansions in higher education seem to have no bearing on the risk of civil conflict, riots, or urban violence – not even in the context of large youth bulges or decreased economic growth. Urdal (2006) found some evidence that the interaction of youth bulges with expansion in higher education was associated with an increased risk of terrorism, but the education data used are inferior to the IIASA data, and the terrorism data are of a somewhat uncertain quality. While this finding could be compatible with individual-level studies reporting higher education as a factor in recruitment to terrorist organizations (see below), the claim should be tested on more comprehensive and reliable data in order to assess its validity.

The argument relating social unrest to large numbers of university students without a prospect for adequate employment has been made with a particular reference to the Middle East (Campante & Chor, 2012; Lia, 2005). However, Barakat and Urdal (2009) still found no effect on civil conflict when they tested the tertiary expansion measure on a subsample of Middle Eastern and North African countries only.

Inter-Group Schooling Inequality Matters

In studies addressing the impact of the uneven distribution of education opportunities on conflict there is less concern with the overall amount education in the population (as measured by enrollment and attainment) or gross government education spending, and more focus on how educational opportunities are distributed between individuals or social groups within a given population. Education is most often treated as just one of several indicators that capture the broader phenomenon of systematic socioeconomic disparities between individuals or groups. Hence, although it has been argued that education can be a particularly relevant indicator of inequality with regard to conflict, it can sometimes be hard to separate effects of educational disparities from those of other forms of inequality. Yet, four of the studies included in this review (Bartusevičius, 2014; Mancini, 2008; Omoeva & Buckner, 2015; Østby et al., 2009) find a positive and statistically significant effect of education inequality on conflict when also controlling for income inequality. One study (Hillesund, 2015) found no effect of education inequality regardless of the inclusion of other measures of inequality. Table 3 summarizes the evidence for a link between educational inequality and conflict, distinguishing between inequality between individuals and four types of inter-group inequality.

– Table 3 Here –

With a few exceptions, Table 3 reveals that the overall conflict potential of disparities in educational opportunities seems to be consistent with a key finding in the broader

inequality-conflict literature: inequality between individuals seems to matter less for conflict, while inter-group inequality increases conflict risks.

With regard to the effect of educational inequality between individuals, two studies (de Soysa & Wagner, 2003; Besancon, 2005) use a cross-national dataset provided by Castelló and Doménech (2002) who computed a Gini coefficient[12] for schooling inequality on the basis of Barro and Lee's (2001) data on education attainment. de Soysa and Wagner (2003) did not find any significant effect of individual-based educational inequality on the risk of civil conflict, though Besançon (2005) found some evidence that individual-level schooling inequality is positively related to ethnic wars and genocides, but not to revolutions. Moreover, Bartusevičius (2014) found evidence of an inverted-J relationship, showing that education inequalities between individuals raise the risk of conflict except at extreme levels of inequality, when it lowers the risk. He holds that while increasing disparities generally cause grievances and thus greater motivations for conflict, very high levels of educational inequality means that the most educationally disadvantaged are very poorly equipped with human resources that would allow them to rebel.

Canavire-Bacarreza, Jetter, and Montoya-Agudelo (2016) employ data from Barro and Lee to examine the impact of educational polarization across the levels of the schooling system on civil conflict. They do so by calculating the share of the population that has achieved four categories of education: no schooling, and completed primary, secondary, and tertiary schooling. They found that societies with a high degree of educational polarization between individuals are more likely to experience conflict. They chalk this finding up to

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[12] The most common measure of inequality is the Gini coefficient – an index between 0 and 1 (or 0 and 100) where 0 implies an egalitarian distribution (perfect equality) and 1 (or 100) indicates total concentration (perfect inequality). Castelló and Doménech (2002) calculate this measure for education years instead of income.

differences between the educated and the uneducated in their normative preferences for what governments should do and how society should operate.

Østby's (2008) cross-national study of 36 developing countries calculates Gini coefficients for years of education based on individual survey data from national Demographic and Health Surveys. She found no effect of such inequality on the likelihood of civil conflict onset. Østby, Nordås, and Rød (2009) found in their sub-national study of 22 countries in Sub-Saharan Africa that regions with high levels of intra-regional inequality have a higher risk of experiencing a civil conflict onset. At the sub-national level, Barron, Kaiser, and Pradhan's (2004) did not find any relationship between schooling inequality and conflict at the community level in their analysis of census- and survey data from Indonesia. But Østby (2016) found that cities with less educated inhabitants are likely to experience violence, and that cities with very unequal access to education see much more violence. Overall, the quantitative evidence on the conflict potential of educational inequality between *individuals*, usually measured as the Gini coefficient of education years, is mixed.

The theoretical proposition that educational inter-group inequalities are particularly conflict-prone receives, in contrast, quite strong empirical support in the reviewed works (Mancini, 2008; Murshed & Gates, 2005; Omoeva & Buckner, 2015; Østby, 2008; Østby & Strand, 2013;). An exception is a study by Barron, Kaiser, and Pradhan (2004), which, contrary to the authors' expectations, found a negative effect of ethnic disparities in education and conflict in Indonesian districts. Another exception is a sub-national study of African regions by Østby, Nordås, and Rød (2009), which failed to find a significant effect of regional relative deprivation of education, though the coefficient had the expected sign.

In a study of 67 developing countries, Østby and Strand (2013) compare the impact of various group identifiers, and conclude that educational inequalities along ethnic lines (more so than religious or regional divides) are particularly conflict-inducing, and especially

in Sub-Saharan Africa. Fjelde and Østby (2014) found the same for communal (non-state) violence between ethnic groups in the African context. Omoeva and Buckner (2015) also examine the effect of Gini education coefficients (measured as differences in mean schooling years between ethnic, religious, and regional groups). They found that educational inequalities based on ethnicity and religion strongly predict civil conflict onset, but that the effect holds mostly for the post-2000 period.

There is also some preliminary evidence that inter-group inequalities in terms of education have a stronger effect on conflict risk than sheer economic inter-group inequalities (measured e.g. in terms of household assets) (Østby, 2008; Østby & Strand, 2013), although, as mentioned earlier, various dimensions of inter-group inequalities tend to co-vary quite strongly. Furthermore, the effect of inter-group inequalities may be influenced by contextual factors. For example, Østby and Strand (2013) found that inter-group educational inequality is particularly likely to fuel conflict in democratic regimes. Their main explanation for this is that in a democratic regime with sharp inter-group inequalities, the motives and opportunities to mobilize against the state are both present.

Finally, the two studies which explicitly test the impact of gender inequality in terms of education and conflict risk found robust support that gender inequality is indeed conflict-provoking (Bussmann, 2010; Melander, 2005). Both studies focus on the direct stabilizing effect of gender equality, and Bussmann (2010) also stresses that education indirectly leads to peace through the promotion of development and good governance. In a similar vein, Barakat and Urdal (2009) report that including female education strengthens the statistical effect that education has on peace.

Disturbing Effects of Educational Content?

School curriculum is likely to be an important factor exposing children to nationalist ideology, which may later feed into support for political violence (Sambanis, 2005; see also Lange, 2011, 2012). However, systematic cross-national data on what is actually taught in

schools is lacking. The only study among the 42 studies reviewed here which - at least to

some extent - analyzes political violence in the light of educational content is a micro-level

study of participation in militant organizations in Pakistan by Fair (2008). Contrary to

common assumptions, she found that Islamist militants are relatively well educated

compared to the rest of the population and that they are *not* predominantly emerging from

Pakistan's religious seminaries, as often suggested. Further, there appears to be few if any

systematic studies addressing the suggested relationship between educational *quality* or

relevance and conflict participation. Hence, more research is needed to understand the

relationship between curricular content and conflict (Novelli & Cardozo, 2008).

Micro-Level Evidence on Education and Involvement in Conflict

There is an increasing awareness in the quantitative civil war literature of the need to

supplement the cross-national macro studies with micro-level research. This trend towards

disaggregating conflict studies has gained momentum recently, and is highly pertinent to the

study of education and conflict as many of the claims of causal relationships made in the

macro studies build on assumptions about individual-level motivations and actions. While

this challenge is widely acknowledged, the number of quantitative micro-level studies is still

limited. A major reason for this is that data on individual motivations of conflict actors are

difficult to obtain (Arjona & Kalyvas, 2007: 2) and such data collection is costly. However,

pioneering studies like Arjona and Kalyvas (2007) and Weinstein and Humphreys (2008),

both of which analyzed privately collected survey data sets of combatants and non-

combatants in Colombia and Sierra Leone respectively, appear to be inspiring more

individual-level research. It is highly likely that we will see a considerable increase in studies

based on privately collected survey data in the coming years, especially as the cost for

collecting such data is coming down.

Each of the micro-level studies of education and conflict reviewed here all explore if

and how the levels of education that individuals have received affects support for, or

participation in, various activities related to political violence. The majority of the studies focus on armed conflict (Arjona & Kalyvas, 2007; Fair, 2008; Humphreys & Weinstein, 2008; Oyefusi, 2010, Shayo, 2007); three studies focus particularly on terrorist activities (Berrebi, 2007; Krueger & Malečkova, 2003; Lee, 2011); and one study looks at the link between education levels and the likelihood of becoming a perpetrator of genocide (Verwimp, 2005). The general findings of these studies are presented in Table 4, with the signs indicating the direction of the relationship. Obviously, one of the limitations of country-specific micro-level analyses of conflict actors is that the results are not generalizable beyond the actual country. Hence, with the limited number of such studies available, we should be careful not to draw general conclusions.

– Table 4 Here –

Overall, the evidence summarized in Table 4 indicates that people with low education amounts are more likely to be recruited into armed conflict. The effect is the opposite for terrorism and genocide, which tend to attract the more highly educated individuals.[13]

Participation in armed conflict.

In a systematic review of arguments pertaining to recruitment of fighters in armed conflicts, Arjona and Kalyvas (2007) argue that existing macro-level studies are based on assumptions of individual-level motivations that can hardly be tested empirically in macro-level designs. In particular, macro-level studies using aggregate measures to test individual-level assumptions commit an ecological fallacy by drawing conclusions about individuals based on group characteristics. Furthermore, one of the important shortcomings of existing macro-

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[13] In
 4 we have not included a study by Pugel (2007) on ex-combatants in Liberia. He reported that those who had completed a reintegration training program appeared to be the most educated among the ex-combatants.

level as well as much micro-level work has been the exclusive focus on recruitment of

insurgents, while recruitment to counter-insurgence organizations has been largely ignored.

Arjona and Kalyvas' (2007) study of Colombia and Humphreys and Weinstein's

(2008) study of Sierra Leone provide very useful tests of rival recruitment explanations by

exploring what it is that distinguishes the individuals who rebel from those who fight to

defend the status quo. Methodologically, both use logistic regression (logit) models aiming

at explaining how recruits to a rebel group differ from either recruits to a paramilitary (pro-

government) group (Arjona & Kalyvas, 2007) or from noncombatants (Humphreys &

Weinstein, 2008), while the latter study also provides a multinomial probit model separating

between voluntary and forced rebel recruitment in Sierra Leone. We will discuss these two

studies at some length here since they offer valuable insights into the micro-level evidence

for some of the general claims in the literature.

Arjona and Kalyvas (2007: 4) argue that there are three main individual-level

arguments for why some persons engage in political violence. First, joining a rebel group

could be understood as a reaction meant to rectify grievances (a so-called 'grievance'

explanation); second, individuals may join based on the expectation of monetary or other

material personal gain (a so-called 'greed' explanation); and third, a person may be attracted

to political violence by the promise of non-material rewards such as security. Among the

indicators used to measure grievances, Arjona and Kalyvas (2007: 22) include low education

levels and illiteracy.

Grievances are assumed to contribute to recruitment to armed groups through two

distinct mechanisms. Recruits may be driven by *consequentialist* motivations: a desire to

end the source of their grievances. Or motivations may be *expressive*, in that recruits are

driven by moral outrage or strong moral values (Arjona & Kalyvas, 2007: 5). In order to

separate the effects of these grievance explanations and test them against other individual-

level as well as structural variables, the authors assume that 'grievances' should be found

disproportionally among those who join organizations committed to challenging status quo.

Despite not being able to unveil the exact mechanism at work, we should expect to see that if

grievance factors are indeed important, individuals joining insurgent groups should be poorer

and less educated, consider themselves to be poorer, come from poorer households and

communities, and feel more excluded compared to those who join *counter*insurgent groups

(ibid: 6). Interestingly, the empirical analysis found that the grievance arguments pertaining

to poverty and low education 'cannot differentiate between people joining the FARC or the

paramilitaries' (ibid: 22). Despite having very different political goals, both sides appear to

be attracting people from the poorest and less-educated elements of society. Furthermore,

the authors also question greed explanations, given that many rebels gave up good sources of

income to join FARC, and that paramilitary fighters appear to be no more motivated by

material rewards than FARC members, even though paramilitaries actually receive

compensation.

One of the main conclusions arising from the study by Arjona and Kalyvas (2007) is

that civil wars are dynamic processes and that much theorizing and many empirical studies

tend to focus too much on the conditions existing prior to the outbreak of war, largely

overlooking the endogenous processes. While 'greed' factors would suggest that individuals

may be 'shopping around' for groups to join, these authors' analysis suggests that

individuals are actually strongly constrained in their 'choices' to join an armed group.

Generally, Arjona and Kalyvas (2007) conclude that none of the theories that have been

advanced in the literature seem to be sufficiently to explain recruitment. Given the

challenges associated with testing causal mechanisms that are derived from over-aggregate

and observationally equivalent theories, they found that additional theorizing as well as

empirical testing is strongly needed.

In a study of both former insurgents and counterinsurgents in Sierra Leone, Humphreys and Weinstein (2008) test three rival explanations; grievances, personal incentives, and social sanctions associated with strong community ties. Like Arjona and Kalyvas (2007) they found that 'grievance factors' like poverty, lack of access to education, and political alienation all explain participation in both insurgent and counterinsurgent groups (Humphreys & Weinstein, 2008: 452). They also found a positive effect between lacking education and participation in rebellion among abductees, questioning the very idea of agency among potential rebel recruits. This could be explained by the fact that areas with poor, uneducated people typically have less means of protection and that army leaders therefore might prefer to target such destinations for recruitment (Achvarina, Nordås, Østby, & Rustad, 2009).

Like Arjona and Kalyvas (2007), Humphreys and Weinstein (2008) conclude that their results call into question a simple grievance model that predicts insurgents to be the most aggrieved. Instead of proxying grievances, Humphreys and Weinstein speculate that poverty and education capture a more general vulnerability to political manipulation, less patience with more peaceful forms of protest, or just fewer life options (ibid.). They further argue that their findings provide some support for all three main theories, and that posing them as rivals and mutually exclusive is artificial.   Rather than continuing to impose different and competing theoretical frameworks on empirical material, Humphreys and Weinstein argue that analysis should focus on 'the conditions under which distinct strategies of recruitment are pursued by different groups at different times' (2008: 453).

Several other individual-level studies add to our understanding of personal motivations. Oyefusi (2010) examines the factors that determine youth's willingness to participate in different forms of civil unrest in the Niger Delta, and found that all three levels of education (primary, secondary, and tertiary) individually reduce the willingness to

participate in violent protest, whereas only secondary and tertiary education constrain disposition to armed struggle.[14] This is consistent with Shayo (2007: 28), who concludes from his investigation of individual-level surveys from 32 countries that 'low education promotes militaristic attitudes'. In contrast, Fair (2008) found in a study of militant martyr households in Pakistan that the militants were more highly educated than the average Pakistani.[15] However, she points out that this finding could reflect the outcome of group selection effects because most of the *mujahideen* in her sample served and died in Kashmir, where the operational environment is very challenging.   Fair's (2008) findings are thus largely consistent with the terrorism literature.

Participation in terrorist activities.

After September 11th, the debate about whether poverty and education influence terrorism has gained considerable momentum. However, the literature has not yet reached consensus on the nature of the education-terrorism relationship. In Brockhoff, Krieger, and Meierriek's (2014) review of the existing quantitative literature on education's influence on domestic terrorism, four of the nine quantitative, cross-country studies they discuss show a negative and significant relationship, two a positive and significant relationship, and three non-significant findings. These authors instead found in their own analysis that education has a conditional relationship with terrorism: in countries where the general socioeconomic, political, and demographic conditions were unfavorable, lower education levels tended to promote terrorism. In more stable, wealthy and demographically mature societies, however, higher education levels tended to reduce terrorism. Examining the motivations of individuals in Europe to go abroad and join Islamic State, Verwimp (2016) found that

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[14] He also found that while higher education constrains participation in violence, it increases the probability for participating in peaceful protests.

[15] Fair (2008) further found that the militants in her sample are not predominantly emerging from Pakistan's *madaris* (religious schools) religious seminaries, as often assumed.

countries with larger education gaps between non-EU immigrants and natives produce higher

numbers of foreign fighters, with Belgium the worst country in the sample in this respect.

One of the most well-known contributions on education's influence on terrorism is a

study by Krueger and Malečkova (2003). Drawing on public opinion polls in the West Bank

and Gaza Strip, they investigate the link between respondents' educational attainment and

their support of and participation in militant and terrorist activities. They found that support

for armed attacks on Israeli civilians does not decrease among those with more education.

Further, they found that (Hezbollah) terrorists have slightly better than average education

than the population in general, but their overall conclusion is that 'any connection between

poverty, education, and terrorism is indirect, complicated, and probably quite weak'

(Krueger & Malečkova, 2003: 119).[16]

Berrebi (2007) reported more robust results linking education and terrorism.

Analyzing the biographies of 335 Palestinian terrorists, he found that higher education is

positively associated with participation in both Hamas and the Palestinian Islamic Jihad

(PIJ). If we take these results at face value, they imply that increasing schooling could

actually increase the supply of terrorists. However, Berrebi (2007) stresses that the

importance of using education to fight terror is not invalidated in spite of his findings. He

suggests that the most likely explanation of the results may be educational content, pointing

to anecdotal evidence on how education can be directly used to breed terrorism (Berrebi,

2007: 28 – 29). Finally, Elbakidze and Jin (2014) provide an alternative explanation more in

line with opportunity cost arguments for transnational terrorism. They found that

improvements in secondary education levels in the labor force leads to higher rates of

participation in transnational terrorism, whereas improvements in tertiary education levels

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[16] Paxton (2002) argues that Krueger & Malečkova's results might apply only to the Middle
East.

has the opposite effect. Higher achievement of tertiary schooling could be interpreted to mean that larger numbers of people are both occupied in the schooling system for a greater number of years, and conceivably receive education that can translate into employment.

Using historical data on 740 individuals involved in the anticolonial movement in the Indian province of Bengal in the early 20th century, Lee (2011) found that both terrorist and the non-terrorist activists were far better educated than the population in which they operated. However, he also notes that the violent sample had a lower status measured by education than the nonviolent sample of activists. Hence, Lee (2011) concludes that terrorists seem to have been drawn from the bottom portion of the politically active elite, a finding that supports the idea that they were motivated at least in part by opportunity costs and personal advantage rather than solely or primarily by ideology or grievances.

Participation in genocide.

Finally, the last category of studies in Table 4 is represented by Verwimp (2005), who presents evidence on the profiles of perpetrators of the Rwandan genocide. He found that perpetrators were more highly educated than others, and suggests that what he terms the 'something to defend thesis' is one way to account for this.

A general lack of education is found to be associated with popular support and over-confidence in armed forces, which in turn increases the risk of conflict (Shayo, 2007). Ignorance and lacking education can help generate and sustain popular support for military campaigns, even if the least-educated supporters of war are not necessarily the most likely to actually fight. This can help reconcile the mixed evidence presented above on the link between individual education and participation in militant activities with the strong macro-level evidence on the relationship between overall education levels and conflict.

Conclusion

Research on the links between education and conflict has been growing rapidly, as evidence by the fact that the majority of the 42 identified quantitative studies included in this review were conducted after 2005. This article provides a first systematic review of this field, highlighting a wealth of new insights from studies conducted at different levels of analysis and across a variety of contexts. In this last section, we draw out what we consider to be the major policy-relevant conclusions based on the review of the existing quantitative evidence of the education–conflict nexus.

A Pacifying Effect of Education

First and foremost, many of the studies we reviewed support the argument that education reduces political violence. The evidence very strongly suggests that increasing education levels in the population at all levels of the system (primary, secondary, and tertiary) reduces most forms of political violence. Recent studies have provided important insights into more subtle aspects of the education–conflict nexus by employing a multitude of measures sensitive to education levels and to changes in access, as well as testing gender- and group-based distributions of education. Secondary male education appears to be the single most suitable discriminator given the theoretical traction – young men in their high teens or low twenties are the main protagonists of violence – as well as empirical variation between countries. While the policy-implications of this finding – invest in education – are already widely pursued as a broader development agenda, security and normative arguments may still be helpful for generating support for education programs.

On a practical note, compared to most other factors that are known to affect political violence, education is something that almost all governments can alter through national policy (Thyne, 2006). However, more research is needed to better understand exactly how and why education influences peace and conflict, because each of the four theories on this relationship lead to different policy prescriptions and priorities. If poorly educated,

unemployed individuals are recruited into violent conflict due to low opportunity costs, then policy makers would be wise to maximize coverage in the form of enrollment and attainment across the population. If, however, individuals mobilize for violence due to grievances over the unequal distribution of education, then policy makers must pay careful attention to ensuring that marginalized groups are granted equal (or perhaps even privileged) access to education. But if the normative argument best explains the education-conflict relationship, then policy-makers ought to emphasize improving curriculum design and pedagogical methods over coverage. In reality, however, quantity (access) and quality considerations are not likely to be mutually exclusive, as an expanded, equal opportunity education system that delivers very poor quality education may be just as bad as a high-quality system with restricted access.

Another important emerging conclusion is that rapid expansion in tertiary education does not generally seem to be causing destabilization and violence. The expansion of tertiary education has been voiced as a concern particularly in relation to recruitment to terrorist organizations, and has also been considered a source of low-level protest. However, there is little empirical support for concerns that governments should be cautious about expanding access to education rapidly, with the caveat that little empirical work has been done on how the interplay between educational expansion and labor market dynamics could impact conflict (but see Campante & Chor, 2012 for an examination of this for executive turnover in the context of the Arab Spring). While policymakers should monitor the situation for educated youths generally, especially following broad expansions in educational access, there is every reason to keep up the pressure for tertiary education expansion as a development strategy to provide opportunities for young people.

Education Inequalities Associated with Conflict

Further, the evidence base clearly supports the argument that systematic educational inequalities between groups are linked to higher levels of violence.   While there is little

evidence that schooling inequality between individuals seems to matter for conflict, systematic differences in access to education between religious and ethnic groups appear to fuel conflict, whether this is caused by 'grievances' or simply by too few opportunities among young people in the disadvantaged groups.   The conflict potential of regional (geographic) disparities in education is stronger for democracies than for other regime types (Østby & Strand, 2013).   This implies that inter-group education inequalities may be a significant force for violent regime change, and that reducing inequalities may contribute to peaceful democratic transitions.   As a result, policymakers should be particularly committed to reducing educational inequalities.

On a related note, greater educational equality between men and women are linked to less violence. Whether the result of a general pacifism among women or an indirect link via the promotion of development and good governance, more gender-equal societies in education seem to experience less political violence. From a policy perspective, policies that reduce significant gender gaps in secondary education between men and women are inferior to policies providing more equal educational access in terms of providing stability and peace. Adopting gender-focused education policies in post-conflict periods may be particularly important given that armed conflict can aggravate gender inequalities in education (Østby, Urdal, & Rudolfsen, 2016).

Education Content and Association with Violence and Terrorism

While educational quality (including curricular content) may plausibly be claimed to affect political violence, systematic evidence for such link is scarce. We have not been able to identify any quantitative study analyzing the effect on conflict of educational quality or content. Evidence from case studies suggests that low relevance and quality of education can seriously hamper young peoples' economic opportunities, but the link to violent conflict is not clear. A particularly striking deficit in the literature pertains to the impact of religious education. To the extent that more religiously oriented content in education reduces the

exposure of students to scientifically oriented 'secular' subjects, or even transmits and reinforces negative stereotypes of 'the other' (e.g. Berrebi, 2007), education may not necessarily have an equally pacifying effect, and could even spur violence. However, there is very limited evidence available on the effect of religious versus secular education, including on the possible links between curricula and violence. While training in religious schools is often cited in relation to recruitment to extremist religious organizations, at least one study on Pakistan seems to suggest that Pakistani militants in Kashmir were not primarily educated in religious schools (Fair, 2008). The lack of studies providing evidence about the relationship between educational content and political violence represents a significant research gap. Finally, there is a need to collect data to enable study of how conflict risk is affected by educational content and quality, and also how targeted education interventions may mitigate conflict.   A promising starting point for the latter is the emerging literature on peace education programs (Bar-Tal & Rosen, 2009; Bush & Saltarelli, 2000; Haggai & Salomon, 2010; Spink, 2005).[17] Overall, the issue of education quality remains an important future research priority.

Although some evidence suggests that terrorists are often well educated and rarely marginalized, this does not imply that providing education in areas prone to terror will lead to more terrorist violence. Much academic and popular attention has been devoted to this connection, in particular with reference to the Middle East and North Africa. However, the higher-than-average education levels among recruits to terrorist organizations is likely to be a *selection effect*, whereby more educated and thus qualified recruits are chosen over less qualified (Berrebi, 2007; Bueno de Mesquita, 2005).   Hence, restricting educational

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[17] See also Dupuy (2009) for an examination of how education is explicitly addressed in peace agreements in the post-Cold War era. Further, cf. a recent meta-analysis by Bowman (2011), who provides a more general account as to how college diversity experiences (both racial and curricular) may impact on civic attitudes and engagement.

opportunities for young people is not likely to be a productive strategy for governments

seeking to curb terror. To enhance our understanding of terrorist recruitment, future studies

on education and terrorism should address the possible mismatch of education and jobs.

Shortcomings and Recommendations for Future Research

The scarcity of reliable and complete education data – particularly in conflict-affected states

– represents a large challenge for comparative analysis of education and political violence.

The recent development of a new country-level sex and age specific dataset on educational

attainment on all levels (see Lutz et al., 2007) offers strong prospects for further empirical

investigation of the education-conflict relationship.   The dataset currently covers 120

countries for the period 1970–2010 with projections up to 2030, and will be expanded to

include several more conflict countries at a later stage. However, education data on the sub-

national level are scarce for many conflict-affected countries, and furthermore existing data

for such countries do not always allow for comparison across countries. Recent approaches

using individual-level survey data to construct regional education data (e. g. Østby, Nordås

& Rød, 2009) are promising, but limited by the lack of survey data for certain countries and

periods. There is also considerable need for systematic individual-level data collection on

participants in political violence that can shed light on individual motivations to join armed

groups, preferably in the form of systematized surveys across conflict and non-conflict

contexts. We believe that the key to understanding the complex relationships between

education and political violence lies at the intersection of structural analyses and micro-level

studies. However, a particular challenge in this respect is the relatively high cost of large-

scale collection of high-quality, sensitive survey data in conflict contexts.

Quantitative studies of education and conflict further offer opportunities for

forecasting future conflict risks. One of the appealing aspects of education data is that they

allow for relatively reliable projections of future educational attainment in the population.

Other major variables used in emerging conflict projection studies, such as regime type,

regime stability, and economic growth, are volatile and thus more difficult to project. Lutz et al. (2007) provide educational attainment projections for 120 countries up to the year 2030, and these projections have proven useful for forecasting future conflict risks (Hegre, Karlsen, Nygård, Strand & Urdal, 2013). In a study that sets out to predict conflict risk levels for the years 2010–2050, Hegre et al. (2013) demonstrate that the expected increase in education levels are likely to contribute to significantly reducing future global conflict levels. Similarly, more generally applicable micro-level studies of education and conflict that take into account educational expansion, the labor market situation, and social and cultural change have the potential to serve as the basis for early-warning systems that can inform policymakers of the potential for political violence and disturbance and to provide relevant policy options.

The study of education and conflict at different levels of analysis provides a crucial, comprehensive picture. As highlighted in this review, more meso- and micro-level studies of education and conflict are required to appropriately analyze some of the most central assumptions of the relationship. In particular, the theoretical frameworks of many macro-level cross-national studies build on assumptions about motivations of conflict actors that cannot be tested in the absence of appropriate micro-level data. An additional challenge pertains to drawing conclusions beyond a study's sample, which is typically restricted to one country. Additional micro-level analyses of more conflict contexts are necessary in order to validate some of the early studies of single countries. Micro-level studies of motivations suggest that multiple theoretical frameworks have to be employed to understand how recruitment to political violence occurs. These studies refute simple claims that the poorest and least educated rebel against the status quo. Rather, poverty and low schooling is associated with recruitment of both insurgents and of ordinary military personnel. A related

research gap is the need for assessing the importance of education for a greater variety of

political (and non-political) violence and for conflict dynamics.

Finally, future research ought to be more context sensitive. As an example, an

important shortcoming of existing studies of educational expansion is that they do not

simultaneously address other factors that matter for the opportunity cost of educated youth.

As pointed out by Barakat and Urdal (2009), the focus should be on identifying the contexts

in which different forms and levels of education have a pacifying effect, and under what

conditions educational reform may contribute to reduce the risk of conflict. The lack of

education has been identified as a particularly potent conflict predictor in low-income

countries as well as in countries with large youth bulges, and recent efforts to increase

education levels in the poorest countries may thus have a significant long-term pacifying

effect. It is further important to note that democracies seem to experience a greater

stabilizing effect of education than do non-democracies. Future research should emphasize

context-specific and interaction effects such as the role of education in rural and urban

settings separately, the interaction of education and the labor market, the role of migration,

and the impact of the systematic exclusion of various identity groups. More specifically,

context-sensitive approaches are likely to yield detailed and practical policy suggestions that

may significantly enhance conflict prevention and resolution capabilities.

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Table 1. Quantitative Evidence of the Links between Education and Political Violence

International cross-country/region/city studies				
Study	**Spatio-temporal coverage; unit of analysis**	**Dependent variable(s) (Conflict/Violence)**	**Main independent variable(s) (Education terms and other central variables)**	**Main finding(s) regarding the effect of education on conflict**
Alesina and Perotti (1996)	71 countries, global sample including all world regions, 1960–1985; country-year.	Political instability (authors)	Primary and secondary school enrollment; (Barro & Lee, 1993)	Countries with higher levels of education tend to be more stable.
Barakat and Urdal (2009)	120 countries, global sample including all world regions, 1970–2000; country-year.	Internal armed conflict (PRIO/Uppsala)	Secondary attainment (all, males); primary to secondary progression ratio; expansion in education (secondary, tertiary) (IIASA); interactions with youth bulges	Large, young male population bulges are more likely to increase the risk of conflict in societies where male secondary education is low, particularly in low and middle-income countries, and particularly in Sub-Saharan Africa. Rapid expansion in higher education does not seem to affect conflict risk.
Bartusevičius (2014)	216 countries, global sample including all world regions, 1961-2009; country-year	Ethic-government; ethnic-territorial; non-ethnic government; and non-ethnic territorial (Categorically Disaggregated Conflict dataset)	Years of school attained within the adult population; Gini coefficient calculated to measure vertical education inequality (Benaabdelaali et al, 2012).	Education inequality has an inverted-J relationship with conflict: it raises the risk of conflict except at extreme levels of inequality, when it lowers the risk.
Besançon (2005)	108 countries, global sample including all world regions, 1960–2001; country-year.	Ethnic wars; revolutions; genocide (Marshall, Gurr & Harff, 2002)	Schooling inequality (Castelló & Doménech, 2002); tertiary education (World Bank, 2000).	Schooling inequality leads to a greater likelihood of higher levels of violence for ethnic wars and genocides, but not revolutions. Tertiary education has a negative impact on ethnic wars and genocides, but is associated with a higher risk of revolutions.
Brockhoff, Krieger, and Meierrieks (2014)	133 countries, global sample including all world regions, 1984-2007; country-year	Number of domestic terrorism incidents (Enders, Sandler & Gaibulloev 2011)	Primary school enrollment per capita, secondary school enrollment per capita, sum of primary and secondary enrollment, university	Country specific circumstances moderate the effect of education on terrorism. Lower education tends to promote terrorism in countries with unfavorable socioeconomic, political, and demographic conditions; higher

			enrollment per capita, literacy rate for people over 15 years.	education tends to reduce terrorism in countries with more favorable conditions.
Bussmann (2010)	100 countries, global sample including all world regions, 1985–2000; country-year.	Internal armed conflict (PRIO/Uppsala)	Literacy (female, male, ratio between the genders); primary, secondary and tertiary enrollment (all, ratio between the genders) (WDI, 2004)	Educational gender equality is associated with lower conflict risk for literacy and all levels of school enrollment. Primary and tertiary enrollment associated with lower risks but secondary enrollment has no impact.
Canavire-Bacarreza, Jetter, and Montoya-Agudelo (2016)	146 countries, global sample including all world regions, 1950-2014; 5-year intervals per country.	Civil wars and civil conflicts (PRIO/Uppsala)	Polarization index to measure population shares for education attainment: no schooling, primary, secondary, tertiary (Barro and Lee 2013)	Societies with a large degree of educational polarization among the population are more likely to experience conflict.
Collier and Hoeffler (2004)	125 countries, global sample including all world regions, 1960–1999; 5-year intervals per country.	Civil war onset (COW)	Male secondary school enrollment (WDI, WB, 1998)	Increasing secondary male enrollment reduces conflict risk.
Collier, Hoeffler, and Söderbom (2004)	55 conflicts, global sample predominantly developing countries, 1960–2000; conflict-time.	Duration of civil war (COW)	Male secondary school enrollment (WB, 1998)	Increasing secondary male enrollment is associated with shorter wars.
de Soysa and Wagner (2003)	92 countries, global sample including all world regions, 1989–2000; country-year.	Internal armed conflict (PRIO/Uppsala)	Schooling inequality (Castelló & Doménech, 2002)	Zero effect of schooling inequality.
Elbakidze and Jin (2014)	77 countries, global sample including all world regions, 1980-2000; country-year.	Transnational terrorism incidents (ITERATE dataset)	Share of the population aged 15 and older that can read and write; share of the labor force with highest achieved education levels (primary, secondary, tertiary).	Education improvement from elementary to secondary is positively correlated with frequency of participation in transnational terrorism events, whereas further improvement from secondary to tertiary level is negatively correlated with participation in transnational terrorism.

Fjelde and Østby (2014)	Sub-national administrative regions for 34 states across Sub-Saharan Africa, 1990–2008; region-year.	Non-state armed conflict (Uppsala Geo-Referenced Event Dataset)	Vertical education inequality measured by Gini education coefficient for years of schooling attained in region; horizontal education inequality measured by ethnic group average years of schooling (DHS surveys)	Both vertical and horizontal education inequalities raise risk of communal conflict.
Hegre (2003)	126 countries, global sample including all world regions, 1960–2000; country-year.	Internal armed conflict (minor & major) (PRIO/Uppsala)	Literacy; secondary school enrollment (WB, 2002); interaction between literacy and regime type	Education has a negative impact on the risk of armed conflict. The conflict risk is increasing in literacy for democracies, but not for non-democratic regimes.
Hegre et al. (2013)	169 countries, global sample including all world regions, , 2008–2050.	Incidences of armed conflict (predictions)	Projection of male secondary educational attainment (International Institute for Applied Systems Analysis)	Increased education levels do have an impact on future global conflict levels. This risk reduction also transmits into neighboring countries.
Ishiyama & Breuning (2012)	1,815 peace agreements/ceasefires (dyads between rebel group and the state), global sample predominantly developing countries, 1975–2000.	Peace duration (recurrence of civil conflict)	Primary and secondary enrollment; university student enrollment per capita from Banks (2011)	Increases in higher education enrollment within first five years of the end of a conflict reduces the likelihood of conflict recurrence
Lange (2012)	160 countries, global sample including all world regions, 1960-1999; country-year.	Ethnic violence (Minorities at Risk dataset)	Total secondary school enrollment (World Bank); secondary school completion rate (Barron and Lee 2000); average years of education	Fewer average years of education, lower secondary enrollment completion, and expansion of education raise the risk of ethnic conflict, particularly in low-income countries with dysfunctional political institutions.
Melander (2005)	107 countries, global sample including all world regions, 1960–1945; country-year.	Internal armed conflict (minor & major) (PRIO/Uppsala)	Female-to-male ratio of higher education	Lower levels of the ratio of female-to-male higher education attainment are associated with lower levels of intrastate armed conflict.

Omoeva and Buckner (2015)	95 countries, global sample including all world regions, 1960-2013; country-year.	Conflict onset (PRIO/Uppsala)	Group Gini – size of differences between group averages in years of schooling (religious, ethnic, regional)	Ethnic and religious inequalities in education raise the risk of conflict onset, but mostly in the post-2000 period.
Østby (2008)	36 developing countries in Asia, Latin America, and Sub-Saharan Africa, 1986–2003,country-year.	Internal armed conflict (PRIO/Uppsala)	Inter-ethnic educational inequality; inter-individual educational inequality (calculations based on DHS)	Higher levels of inter-ethnic educational inequality have a positive impact on conflict risk, but inter-individual educational inequality has no impact.
Østby (2016)	34 cities in 31 countries in Asia and SSA, 1986-2006; city-year.	Urban social disorder (PRIO)	Average years of education for city dwellers, and Gini coefficients to measure vertical education inequality (DHS data)	Cities with less educated inhabitants are likely to experience violence, and cities with very unequal access to education see much more violence.
Østby et al. (2009)	Sub-national regions in 22 countries across Sub-Saharan Africa, 1986–2004; region-year.	Region involvement in internal armed conflict (PRIO/Uppsala)	Regional measures of average education, relative deprivation; and intra-regional inequality in terms of education years (authors)	Conflict onset is less likely in regions with lower average education levels and regions with sharp intra-regional education inequality.
Østby & Strand (2013)	67 developing countries in Asia, MENA, Sub-Saharan Africa, Latin America, 1986–2008; country-year.	Internal armed conflict (PRIO/Uppsala)	Inter-ethnic, inter-religious, and inter-regional educational inequality (author's calculations based on DHS)	All types of inter-group education inequality are positively associated with conflict risk. This impact is particularly strong in democratic regimes and in countries with regularly installed leaders.
Shayo (2007)	33 countries, 1960–2000, overrepresentation of higher-income and democratic states; country-year; including micro-level study (see below).	Civil war (Fearon & Laitin, 2003)	Educational attainment (Barro & Lee, 2000)	Increase in average schooling of population reduces the risk of civil war.
Thyne (2006)	160 countries, global sample including all world regions, 1980–1999; country-year.	Civil war (Fearon & Laitin, 2003)	Educational expenditure; primary, secondary (both male and universal), post-secondary enrollment rates, adult literacy rates (WDI, 2004; UNESCO, 2004)	Education has a general pacifying effect on civil war, but not postsecondary enrollment (which has no effect).

Urdal (2006)	All sovereign states in the international system, 1950–2000 (1984–1995 for terrorism and riot models), global sample including all world regions; country-year.	Internal armed conflict (PRIO/Uppsala); terrorism, riots (King & Zeng, 2001)	Tertiary education growth (UNESCO/USAID, 2003)	The interaction of youth bulges with expansion in higher education increases the risk of terrorism, but not of civil conflict and rioting.
Urdal and Hoelscher (2009)	55 cities in Asia and SSA, 1960–2006; city-year.	Urban social disorder (lethal and non-lethal) (Urdal, 2008)	Male secondary educational attainment; expansion in tertiary education for males (Barakat & Urdal, 2008)	Low levels of secondary educational attainment are associated with increasing levels of (lethal) urban social disorder. No interaction effect with youth bulges or effect of expansion of tertiary education.
Verwimp (2016)	12 countries in Europe; cross-sectional; country level.	Data on foreign fighters: International Centre for the Study of Radicalization and Political Violence	Educational achievement: PISA test scores in mathematics	Greater numbers of foreign fighters came from countries with a greater education gap between native and immigrant populations.

Single country meso-level studies

Study	Spatio–temporal coverage	Dependent Variable(s) (Conflict/Violence)	Main Independent Variable(s) (Education terms and other central variables)	Main Finding(s)
Barron, Kaiser, and Pradhan (2004)	69,000 villages and neighborhoods in Indonesia, 2002–2003; cross-sectional.	Conflict at community level (Indonesia's Village Potential Statistics survey (PODES), 2003)	Inter-individual and inter-ethnic group inequality of years of schooling (2002 Indonesian Village Census)	Inter-individual educational inequality has no effect on conflict. Higher educational inequality between large ethnic groups is associated with lower levels of conflict.
Mancini (2008)	164 districts across 19 provinces in Indonesia, 1995–2004; cross-sectional.	Ethno-communal violence (UNSFIR / Varshney et al., 2004).	Inter-ethnic group inequality of years of education (1995 Intercensal Population Survey (SUPAS))	On average, inter-ethnic educational inequality is generally lower in peaceful districts.
Murshed and Gates (2005)	75 districts in Nepal, 1996; cross-sectional.	Conflict intensity: Number of people killed by district (Gautam, 2001)	Schooling gap between each district and Kathmandu (UNDP, 1998)	The schooling gap between a district and Kathmandu is negatively associated with deaths due to armed civil conflict.

Study	Spatio–temporal coverage	Dependent Variable(s) (Conflict/Violence)	Main Independent Variable(s) (Education terms and other central variables)	Main Finding(s)
Tadjoeddin and Murshed (2007)	Javanese districts, Indonesia, 1994–2003; district-year.	Everyday 'routine' violence (UNSFIR / Varshney et al., 2004).	Mean education years (BPS-Statistic Indonesia)	The relationship between violence and education takes inverted-U shape: Initially, violence increases as education rises, but, later on, the level of violence falls as education continues to increase.
Urdal (2008)	27 Indian states, 1956–2002;state-year.	Internal armed conflict (PRIO/Uppsala); political violent events (IPS/Marshall, 2001), Hindu-Muslim riots (Varshney & Wilkinson, 2004)	Literacy (Central Statistical Organization (CSO), annual)	Literacy has no impact on armed conflict risk, slightly positive effect on political violence, and negative impact on Hindu-Muslim riots.

Micro-level studies

Study	Spatio–temporal coverage	Dependent Variable(s) (Conflict/Violence)	Main Independent Variable(s) (Education terms and other central variables)	Main Finding(s)
Arjona and Kalyvas (2007)	Survey of 829 demobilized combatants from three cities (Bogotá, Cúcuta & Montería) and 545 civilians (from 17 locations) in Colombia, June–October, 2005.	Armed actor recruitment (rebel and counter-insurgent factions) (authors)	Literacy, education level (authors)	No education difference between paramilitary and guerilla fighters.
Berrebi (2007)	Biographies of 335 Palestinian terrorists, 1987 to 2002.	Participation in terrorist activities by members of the Hamas and PIJ (author)	Schooling years (authors)	Higher education is positively associated with participation in Hamas or PIJ and with becoming a suicide bomber.
Fair (2008)	Survey of 141 militant (martyr) households in Pakistan, August 2004–April 2005.	Participation in militant group (author)	Education level (author)	The militants in the sample are well educated and are not predominantly emerging from Pakistan's religious seminaries, as is often suggested.
Hillesund (2015)	Survey of 1002 households in the West Bank and 1040 in Gaza Strip, February 2011	Index measure of support for violent and/or non-violent resistance (author)	Years of higher (tertiary) education (author)	Education inequalities do not shape attitudes regarding support for violent resistance.

Humphreys and Weinstein (2008)	Survey of 1,043 ex-combatants + 184 noncombatants in Sierra Leone, June–August 2003.	Membership in the RUF, CDF (authors)	Lack of education (authors)	Lack of education predicts participation in both rebellion and counter-rebellion.
Krueger and Malečkova (2003)	1,357 Palestinian Respondents in the West Bank & Gaza, December 19–24, 2001.	Support of and participation in terrorist or militant activities (authors)	Educational attainment (authors)	Terrorists have slightly better than average education than the population in general.
Lee (2011)	740 individuals listed in the January 1915 ed. of the Intelligence Bureau's 'Red Book', listing every individual in the Province of Bengal, India considered a political threat.	Terrorist participation (author)	Years of education (author)	The terrorist activists in Bengal were found to be far better educated than the population in which they operated (however not as well educated as the non-terrorist activists).
Oyefusi (2010)	1,300 survey respondents in the Niger Delta, February–August, 2005.	Different forms of civil unrest (author)	Educational attainment and studentship (author)	Primary, secondary and tertiary education reduces the willingness to participate in violent protests. Secondary and tertiary education reduce the probability of having a disposition to armed struggle.
Pugel (2007)	590 former ex–combatants, Monrovia, Liberia, February–March 2006.	Registration/enrollment in a reintegration program (author)	Education level (author)	Those ex-combatants who had completed a reintegration training program appear to be the most educated.
Shayo (2007)	38 WVS surveys from 32 countries, primarily in OECD/European countries, with average of 1,250 respondents per survey.	'Confidence in armed forces' (World Values Surveys)	Schooling years (World Values Surveys)	Low education promotes militaristic attitudes.
Verwimp (2005)	1,838 respondents from 350 Rwandan households for periods 1989–1992 and 2000.	Perpetrator of genocide (author)	Educational attainment (author)	Educated individuals are over-represented among the perpetrators.

Table 2. *Conflict potential of education levels: Macro- and meso-level evidence*

Study	*Education variable*	*Effect*	*Note*
Alesina and Perotti (1996)	Primary	Neg.	
Barakat and Urdal (2009)	Secondary	Neg.	
Bartusevičius (2014)	Years of schooling	Neg.	Violence increases as education inequalities rise, but declines with extreme inequality
Besançon (2005)	Tertiary	Pos.; Neg.	Positive effect on ethnic wars and genocides, negative effect on revolutions
Brockhoff et al (2014)	Primary; Secondary	Pos.; Pos.	Effect holds under conditions of unfavorable socioeconomic, political, and demographic conditions
Bussmann (2010)	Primary; Secondary; Tertiary, Literacy	Neg.; Zero; Neg. Neg	
Collier and Hoeffler (2004)	Secondary	Neg.	Males only
Collier et al. (2004)	Secondary	Neg.	Males only; dependent variable is conflict duration
Elbakidze and Jin (2014)	Primary; secondary	Pos.; Neg.	Dependent variable is transnational terrorism incidents
Hegre (2003)	Primary; Secondary	Neg.; Neg.	
Hegre et al. (2013)	Primary; Secondary; Tertiary	Zero; Zero; Neg	
Ishiyama & Breuning (2012)	Primary	Zero; Zero; Neg.	Literacy levels no effect on armed conflict; pos. effect on political violent events, and neg. effect on riots
Lange 2012	Secondary; Years of schooling	Neg: Neg	Dependent variable is ethnic conflict.
Østby et al. (2009)	Years of schooling	Neg.	
Shayo (2007)	Years of schooling	Neg.	
Thyne (2006)	Primary; Secondary; Tertiary; Literacy; Govt. spending on ed.	Neg.; Neg.; Zero; Neg. Neg.	
Urdal (2006)	Tertiary	Neg.	Expansion of tertiary ed. increases risk of terrorism
Urdal and Hoelscher (2009)	Primary; Secondary; Govt. spending on ed.	Neg.; Neg.	
Barron et al. (2004)	Secondary	Neg.	
Tadjoeddin and Murshed (2007)	Years of schooling	Inverted U.	Violence increases as education rises, but declines as education continues to increase
Urdal (2008)	Literacy	Zero; Pos.; Neg.	

Table 3 *Conflict potential of educational inequality: Macro- and meso-level evidence*

Study	Basis of inequality	Effect	Note
Bartusevičius (2014)	Individuals	Neg	
Besançon (2005)	Individuals	Pos.; Zero	Dependent variable: Positive effect on ethnic wars & genocides; no effect on revolutions.
Bussmann (2010)	Gender	Pos.	
Canavire et al. (2016)	Individuals	Pos.	
de Soysa and Wagner (2003)	Individuals	Zero	
Fjelde and Østby (2014)	Individuals; ethnic groups	Pos.; Pos.	Dependent variable: communal violence.
Melander (2005)	Gender	Pos.	
Omoeva and Buckner (2015)	Ethnic groups; religious groups; regions	Pos.; Pos.; Pos.	Effect of ethnic and religious education inequalities are significant in post-2000 period only, while regional equalities matter regardless of time period
Østby (2008)	Individuals; ethnic groups	Zero; Pos.	
Østby (2016)	Individuals	Pos.	Dependent variable: urban violence
Østby, Nordås, and Rød (2009)	Individuals; regions	Pos.; Zero	Intra-regional inequality
Østby and Strand (2013)	Ethnic groups; religious groups; regions	Pos.; Pos.; Pos.	
Verwimp (2016)	Individuals	Pos.	Dependent variable is foreign fighter numbers.
Barron, Kaiser, and Pradhan (2004)	Individuals; ethnic groups	Zero; Neg	Intra-district inequality in Indonesia.
Mancini (2008)	Ethnic groups	Pos.	
Murshed and Gates (2005)	Regions	Pos.	

Table 4 *Education level and conflict recruitment: Micro-level evidence*

Study	Dependent variable	Effect	Note
Arjona and Kalyvas (2007)	Armed conflict	Zero	The dependent variable pertains to the difference in average education level between individuals in rebel groups and counter-insurgency groups. The education results are not included in the final empirical model but reported in passing as insignificant findings (Arjona & Kalyvas, 2007: 22).
Berrebi (2007)	Terrorist activity	Pos.	The positive effect of education holds for both recruitment to terrorist organization and to participating in e.g. suicide bombing.
Fair (2008)	Armed conflict	Pos.	The dependent variable pertains to martyrdom during participation in Islamist militant groups in Pakistan. These were originally state-sponsored actors, but recently many have turned against the state.
Hillesund (2015)	Armed conflict	Zero	
Humphreys and Weinstein (2008)	Armed conflict	Neg.	The negative effect of education pertains to both recruitment to rebel groups (both voluntarily and forced) and to counter-insurgencies.
Krueger and Malečkova (2003)	Terrorist activity	Pos.	
Lee (2011)	Terrorist activity	Pos.	
Oyefusi (2008)	Armed conflict	Neg.	The dependent variable pertains to both disposition to armed struggle and the willingness to participate in violent protests.
Shayo (2007)	Armed conflict	Neg.	Dependent variable pertains to 'support for armed forces'.
Verwimp (2005)	Genocide (perpetrator)	Pos.	