The Effects of Political Unrest on Youth Human Capital Accumulation in Egypt

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Abstract
Although discussions of the economic and social causes of the Arab Spring often focus on the role of young people, little research has examined the effects of the unrest on their outcomes—particularly on human capital investments that are critically important at this stage of the life course. This echoes the broader paucity of research on the impact of exposure to political unrest (as opposed to armed conflict) on youth development. This paper addresses this gap by examining the effects of exposure to political unrest on human capital investments for a nationally representative panel of young people in Egypt surveyed before and after the January 25th Revolution. By linking a second dataset, comprised of all events of political unrest occurring throughout the transition period, we exploit exogenous temporal and geospatial variation in exposure to unrest to estimate a difference-in-difference model on a range of outcomes: affective perceptions of institutional and social trust, mental health, educational progression, and risk behaviors. Preliminary results show that there are some effects of the occurrence of protests and riots on affective perceptions of trust and uncertainty, but few effects on more downstream outcomes for education, mental health, and risk behaviors. Additional analyses to further explore rural/urban differences, additional measure of exposure to political unrest, and impacts on youth who themselves participated in protests, are planned.

Keywords
Human capital, young adults, transition to adulthood, political unrest, political protests, Egypt

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I. Introduction

Young people have featured prominently in popular and academic discussion of the causes of the Arab Spring, as well as debates over the social groups that led and participated in the wave of protests that rocked the region starting in 2011. The grievances of youth cohorts with high educational attainment but facing poor economic prospects, limited opportunities for social mobility and a lack of political voice, have been the main basis for the argument that young people drove the Arab Spring, although empirical evidence for this claim is mixed (Cammett and Salti 2016; Campante and Chor 2012; Hoffman and Jamal 2012). In Egypt, as in the rest of the region, young people suffered from high rates of unemployment and dissatisfaction with labor market conditions, declining social mobility, and limited political participation prior to the Arab Spring (Assaad 2008; Binzel 2011; Dhillon and Yousef 2009; Population Council 2010). Youth activists and protesters in the country were also instrumental in the political protests that toppled the long-standing Mubarak regime in 2011 (Shehata 2012).

However, Mubarak's downfall did not end Egypt's period of political transition; the country experienced direct military rule and two new presidents by 2013, multiple elections and constitutional referendums, and the rise of militant groups in some part of the country. Since 2011, and particularly during 2013 and 2014[1], Egypt thus experienced heightened levels of political unrest, unlike a number of countries in which the Arab Spring led to civil war, but also unlike the pre-2011 period during which political unrest was very limited. Despite the focus on youth and youth grievances as causes of the January 25th Revolution, very little research has examined the effects of this unrest on their outcomes — particularly on human capital investments that are critically important at this stage of the life course. One study of children aged 10 to 15 attending primary school near Tahrir Square in 2012 found high rates of symptoms of depression, anxiety and post-traumatic stress disorder. As the study was not

[1] ACLED Conflict Trends Report, No. 30, September 2014; No. 43, November 2015. http://www.acleddata.com/research-and-publications/conflict-trends-reports/

representative, the authors argued for the need for population-based estimates of the impact of exposure to violence on young Egyptians' mental health (Moussa et al. 2015). Another study that did use nationally representative data focused exclusively on the impact of the Revolution on women's labor market outcomes (El-Mallakh et al. 2015).[2] To the best of our knowledge, no studies have examined the impact of Egypt's political unrest on mental health or related risk behaviors among a broader sample of Egyptian youth, or outcomes related to human capital investments.

The limited evidence on the impact of exposure to protest or violent activity during Egypt's political transition and the Arab Spring more broadly echoes the broader paucity of research on the impact of exposure to political unrest (as opposed to armed conflict) on youth development; existing studies have focused on a few cases (the Israeli-Palestinian conflict, South Africa apartheid, Maoist insurgency in Nepal), and primarily rely on small, non-representative samples. Their results are also mixed, suggesting that processes for coping with exposure to political unrest during the transition to adulthood are complex and need to be contextualized. The lack of evidence on young people's responses to political instability is an important gap in our understanding of the transition to adulthood – particularly in the aftermath of the Arab Spring.

This paper addresses this gap by examining the effects of exposure to political unrest on mental health and human capital investments for a nationally representative panel of Egyptian youth surveyed in 2009 and 2013/2014 through the Survey of Young People in Egypt (SYPE). By linking the SYPE to a second dataset, the Armed Conflict Location & Event Data Project, comprised of all events of political unrest occurring throughout the transition period, we exploit exogenous temporal and geospatial variation in exposure to unrest to estimate a difference-in-difference model on education and health outcomes. Preliminary results show that there are

[2] El-Mallakh et al. also use a similar identification strategy to our own but with different data, both for the measurement of outcomes and the measurement of protest events.

some effects of the occurrence of protests and riots in youths' districts of residence on affective perceptions of trust and uncertainty, but few effects on more downstream outcomes for education, mental health, and risk behaviors. Additional analyses to further explore and exploit geospatial variation in the occurrence of protests and riots (and potentially other types of events) and regression specifications are planned.

1.1 Background

Internal political unrest (both violent and non-violent) continues to affect many countries and has been particularly pronounced in countries experiencing a youth bulge. The number of large-scale political protests and the extent of civic conflicts have increased markedly since 2010 (Brandt n.d.), including the wave of unrest in the Arab Spring. Expressions of political anger, often resulting in violence, can be traced to frustrations over economic decline, unemployment, and inequality (Malik and Awadallah 2013). Researchers have theorized linkages between the rise in civic unrest and the surge in the population under age 30, for whom these issues are most pronounced (Campante and Chor 2012).

However, although many studies have examined the impacts of wars and armed conflict (Derluyn et al. 2004; Hegre et al. 2009; Pellillo 2012; Rockmore 2011; Voors et al. 2012) on youth development, little is known about less extreme events, such as political unrest, that may not involve complete destruction of infrastructure but that nonetheless may have lasting deleterious effects. Less violent events may also introduce uncertainty and disruption of social structures and institutions, inducing a variety of psychosocial stressors that contribute to poorer wellbeing. While political protest can remain peaceful, it may also involve a state mobilizing against its own citizens, sectarian disputes within communities, riots, unlawful detention, torture, and politically motivated attacks, events that incite fear and feelings of insecurity. Studies that have focused on the impacts of political unrest (as distinct from war and armed conflicts) on youth have predominantly investigated a few historical events (South African apartheid (Dawes

1990; Lockhat and van Niekerk 2000; Seedat et al. 2000), the Israeli-Palestinian conflict (A. M. Baker 1990, 1991; A. Baker and Shalhoub-Kevorkian 1999; Barber 2001; Elbedour et al. 1997; Punamäki et al. 2001; Qouta et al. 1995, 2007), and Maoist insurgency in Nepal (Axinn et al. 2013; Williams 2013; Williams et al. 2012)). The results of these studies show mixed effects of exposure to political unrest on self-esteem and psychological symptoms among youth, suggesting that emotional processes for coping with these types of events during the transition to adulthood are complex. In Nepal, where the only large-scale population study has been conducted, Williams and colleagues study the effects of armed conflict on population responses, including marriage, migration, and contraception(Williams et al. 2012). While there is an emerging literature on quantifying the effects of exposure to less extreme events, there is much to be gained by examining the impact of such events during the transition to adulthood—a critical period of development—across a variety of outcomes and with more rigorous methods.

Our examination of how exposure to political protests can affect human capital accumulation among youth and young adults is guided by Life Course theory (Dhillon and Yousef 2009; Elder and Rockwell 1979; Hogan and Astone 1986; Shanahan 2000) and the Transactional Model of Stress and Coping (Antonovsky and Kats 1967; Cohen 1984; Lazarus and Cohen 1977). Following the Transactional Model of Stress and Coping (Antonovsky and Kats 1967; Lazarus and Cohen 1977), individuals may cope with the proximal circumstances in ways that alter their life course trajectory. While political unrest may temporarily disrupt the flow of critical investments (e.g. schooling, health), the process of coping with stressful events may also lead individuals to reduce the take-up of investments if they perceive these events to be a threat. Human capital investments central to life transitions may be especially at risk; as confidence in institutions deteriorates, youth may invest less in established routes of success (e.g. schooling), become despondent about their future and invest less in their long-term welfare, and take up risky behaviors (e.g. substance abuse, violence) or experience poorer mental health (Sadler and Gupta 2014).

The disruption of human capital investments during youth and the transition to adulthood may be particularly deleterious. According to Life Course theory, the disruption of individuals' progression through age-differentiated roles, and the delay of or failure to successfully complete certain socially or institutionally conditioned events (e.g. marriage and school-to-work transition during the transition to adulthood), may lower overall wellbeing prospects and lead to poorer life outcomes (Elder 1998; Elder and Rockwell 1979; Hogan and Astone 1986; Shanahan 2000). Thus, short-term decisions made in response to ecological stressors experienced during youth may be particularly critical if these decisions interrupt expected pathways through the transition to adulthood, leading to long-term implications for future wellbeing.

The need to understand the impacts of internal political unrest on the wellbeing of youth is crucial given that longer-run economic and political stability will depend on the future productivity of this generation. Investments made by young people in their health, education and social integration, among other factors, have long-term ramifications for both the individual and society at large. However, young people (defined by the UN as people aged 10-29) are also disproportionately affected by mental disorders and related risk behaviors (Whiteford et al. 2013), which are often not recognized or addressed until later in life (Patel et al. 14). While the issue of youth wellbeing is especially acute for demographically "young" countries—many of which have some of the highest burdens of disease due to mental disorders and related risk behaviors (Ferrari et al. 2013)—recognition of the ill effects of psychosocial stress is only now gaining attention (Coutts et al. 2013; Sadler and Gupta 2014). In the Middle East and North Africa (MENA) region, the burden of poor mental health is particularly large and is a leading cause of years lived with disability and disability adjusted life years lost in the region (Ferrari et al. 2013; Mokdad et al. 2014). Additional insight into how the myriad political crises in the region may be affecting youth mental health and related risk factors is therefore critically important.

1.2 Study aims and hypotheses

This paper aims to rigorously estimate the effects of exposure to political unrest on a range of outcomes—affective perceptions of institutional and social trust, mental health, educational progression, and risk behaviors—for a panel of youth and young adults spanning recent events in Egypt. We estimate a difference-in-difference model comparing outcomes for individuals in places where different levels of protest and riot activity occurred, including any occurrence of an event, increasing numbers of events, and according to the absence or occurrence of fatalities in any of the events. Based on our theoretical framework, we hypothesize that:

> ***H_1:** *The occurrence of political unrest will negatively affect individuals' mental health and their human capital investments.*
>
> ***H_2:** *The effects of exposure will increase with greater intensity and severity of political events*.
>
> ***H_3:** *The effects of exposure to political protests will differ for different sub-populations, namely young men vs. women and rural vs. urban youth.*

The remainder of the paper is organized as follows. Section 2 describes the methods, measures, and statistical approach employed in the analysis. Section 3 presents our main findings on the effects of riots and protests on human capital accumulation, along with auxiliary and sensitivity analyses. Section 4 discusses the main results within the context of the existing literature and the limitations of the data and analysis.

2. Methods

2.1 Data sources

Our primary dataset is the panel Survey of Young People in Egypt (SYPE), a nationally representative survey of young people aged 10 – 29 in 2009 who were then followed-up in 2013/4. With a follow-up rate of 72.6% from the first wave, the SYPE constitutes a panel of 10,916 young people who were surveyed both before and after the events of the Arab Spring (Roushdy and Sieverding 2015). The SYPE data include a wide range of measures related to

the transition to adulthood, in domains including education, employment, health, family formation and civic participation. From the SYPE, our outcomes of interest are: (1) affective perceptions of social trust and life uncertainty; (2) investments in education, measured through changes in on-time completion and absenteeism in the school year of the survey; (3) psychosocial wellbeing, measured through the validated Self-Reporting Questionnaire-20 (SRQ-20); (4) and health risk behaviors.

The second dataset is the Armed Conflict Location & Event Data Project (ACLED), which captures all reported political events (violent and non-violent) since 1997 (Raleigh et al. 2010). ACLED is a publicly available database that collates and codes conflict events in real time based on newspaper reports. ACLED also produces an annually compiled dataset; in this paper, we use ACLED Version 5, which covers all events through December 31st, 2014. The database includes the location and date of the event, the type of event, actors involved, number of resulting fatalities, and a brief description of the event. Using ACLED, we construct metrics of exposure to political unrest for each *qism/markaz* in Egypt, which is the lowest level geographic variable available in the SYPE data. We then link the two datasets by qism/markaz for all individuals in the SYPE panel, obtaining the protest and riot events that occur in each individual's area of residence between the dates of the two SYPE wave interviews. Our analysis excludes the Governorates of North and South Sinai, as our aim is to study exposure to political unrest and the type and intensity of events in the Sinai during the period of study are closer to that of a sustained, violent civil conflict. This results in 10,225 individuals in the SYPE panel with matched ACLED events data.

2.2 Occurrences of riots and protests

We completed an extensive cleaning of the ACLED data prior to creating the exposure measures. ACLED included GPS coordinates for all events, but some of these were coded to the level of the nearest large city, or at times a generic center point of the governorate. Where

GPS coordinates were incorrect or could be coded to a more precise location according to the event description, we manually changed the GPS coordinates based on Google Maps. We also created a new variable to denote the geographic precision of the GPS estimate, ranging from the most precise (1; coded to the village or city neighborhood/landmark at which the event occurred) to the least (7; center point of the governorate). Only events that were coded to a precision level of 3 (center point of a medium city or greater precision) were kept.

Although the ACLED data categorize events into nine types, we also restrict this analysis to those categorized as riots and protests, which are defined by ACLED as violent and non-violent group demonstrations, respectively, and are coded as one category in the dataset. We restrict the data to this category because it is the closest to operationalizing the concept of political unrest. Other event type categories in the ACLED include non-violent political events occurring during a protected conflict (e.g. in the case of Egypt court rulings, arrests and deployment of security forces), transfers of territory, three types of battles, and remote violence (e.g. missile attacks), that capture other aspects of political or civil conflict. Outside of the Sinai, riot and protest events were also by far the most common type of event that young people in our sample were exposed to, accounting for 84% of the 2,289 events occurring between 2011 and 2014 in *qisms/markaz* where there were SYPE residents (after cleaning).

For all riots and protests events occurring between the dates that SYPE respondents were interviewed in each wave, we aggregate the number of events and construct three variables for each qism/markaz:

1. Any event: Our basic measure for *exposure* to political unrest is a dummy variable that indicates the occurrence of any protest or riot versus no such event.
2. Number of events: This measure of the *intensity* of the political unrest is coded as an ordinal variable representing the occurrence of 0, 1 2-4, 5-19, or 20 or more events; these categories were *a priori* chosen based on the evenness of the event occurrence distribution across qism/markaz areas and across individuals in the SYPE panels

3. Occurrence of deaths: This proxy for the *severity* of political unrest is a categorical variable that distinguishes between areas in which there were (a) no riot or protest events, (b) events, all of which occurred without fatalities, (c) events, at least one of which resulted in a fatality.

Dummy and categorical variables were chosen over the continuous number of events because of the large existence of many qisms/markaz where no events occurred, and consequently a large percentage of individuals residing in areas that did not experience any unrest (see **Section 3.2**).

2.3 Outcome measures

Affective outcomes

We use two measures of affective outcomes asked in both SYPE waves for respondents who were aged 15 or over in 2009:

- Trust: Respondents were asked, “Generally speaking, would you say that most people can be trusted, or that you need to be very careful in dealing with people?” We create a dummy variable indicator for responses that “most people can be trusted” (versus responses of “must be too careful”).
- Uncertainty: Respondents were asked to rate their feelings of uncertainty about the future on a 10-point Likert scale in response to the question, “In your opinion, on a scale from 1 (very certain) to 10 (very uncertain), what is the degree that reflects your feeling of uncertainty about your future?” We retain the continuous scale index as is.

Education

For individuals who were enrolled in school during both survey waves, we construct three measures for education outcomes that may reflect the interruption of investments in school:

- Absence from school is a binary indicator coded 1 if the respondent reported missing school or university for at least one day during the school year.
- Days absent is a continuous variable of the number of days of school that the respondent missed during the year.
- Delayed school completion captures whether in-school respondents were currently in the level and grade of school that is on time for their age. We use a generous definition of on-time progression through school that allows students two years more than the expected age of completion for each school level. The variable is coded based on changes in on-time progression between the survey waves, so that students either caught up from being behind, did not change whether they were progressing on time, or became delayed relative to their expected grade.

Mental health: SRQ-20

For individuals aged 15 or over in 2009, 20 WHO-validated questions were asked to measure overall mental health status. The Self-Reporting Questionnaire-20 (SRQ-20) was designed to screen for psychiatric disturbance in primary health care settings (Beusenberg and Orley 1994). A series of 20 questions ask about physical symptoms of psychiatric disturbance, feelings of nervousness, uncertainty and interest in daily activities, and sense of self-worth (see **Appendix B** for more information on the component items). Positive responses to any item indicate the presence of a poor mental health indicator. Thus, scoring for the SRQ-20 sums all positive answers to create an index ranging from 0 to 20. Low values of the summary index represent relatively "better" mental health status; conversely, higher scores represent relatively "worse" mental health status. Recent studies suggest that scoring the SRQ-20 needs to take

gender into account (Ghubash et al. 2001; Scholte et al. 2011). In the SYPE sample, SRQ-20 score distributions substantively differ by gender.[3]

To examine changes in mental health status over time, we specify the outcomes as the difference in the summary index scores between waves (i.e. 2014 minus 2009), which ranges from -20 to +20. If the index score remains the same in both waves, then the difference is calculated as a "0," reflecting no change in the respondent's overall mental health. If the 2014 score is higher than the 2009 score, then the difference will be positive and indicates a worsening of mental health status over time. Conversely, if the 2014 score is lower than the 2009 score, the resulting difference is negative, reflecting an improvement in mental health. We use the continuous index score and its change as the main outcome for all statistical analyses.

Risk behaviors

Finally, we examine three measures of risk behaviors among young people:

- Smoking: We create a dummy indicator if the respondent reports that they either "currently smoke occasionally," are "currently smoking," have "tried some puffs", or "smoke other tobacco products than cigarettes" versus never smoked or stopped smoking.
- Drinking (for respondents aged 15+ in 2009): We create a dummy indicator that represents a positive response to the question, "Have you tried any alcoholic drinks?"
- Drug use (for respondents aged 15+ in 2009): We create a dummy indicator that represents a positive response to the question, "Have you experimented with any drugs before?"

[3] Liu, Modrek and Sieverding "*The mental health of youth and young adults in Egypt during the transition to adulthood*". Under review.

In the conservative context of Egypt, where drug use and particularly drinking are taboo, as well as smoking for young women, we expect that these items are underreported, particularly among young women.

2.4 Econometric analyses

We estimate the effects of the occurrence of protests and riots in an individual's qism/markaz of residence by leveraging the panel feature of the data and including individual-level fixed effects. Exposure to protest and riot events may be correlated with both observable (e.g. better educated youth live closer to universities where some protests have occurred) and less unobservable/quantifiable characteristics (e.g. strong political convictions), potentially biasing estimates of the effect of event occurrence. The fixed effects model controls for all time-invariant differences in individual characteristics, using only within-individual variation to compare changes in outcomes over time (rather than levels) in protest-affected PSUs to changes in outcomes over time in unaffected areas (i.e. a difference-in-difference model).

We further transform the panel data by first-differencing all variables, expressing both independent and dependent variables as the change in levels between 2009 and 2014; any variables that do not vary over time thus drop out of the equation. This transformation enables us to additionally add observable sociodemographic characteristics measured at baseline (i.e. in 2009) to further control for any initial differences in these characteristics between individuals. Because the occurrence of events and individual-level outcomes can also be correlated with unobservable area-level characteristics (e.g. based on features of the labor market), we include governorate-level fixed effects to remove this source of confounding.[4] Our regression model is specified as follows:

[4] Governorates are the first level administrative unit in Egypt; there are currently 27 governorates. Specification tests comparing the inclusion of governorate fixed effects to random effects and pooled OLS models indicate that governorate fixed effects should be included for the consistency of estimated effects.

$$\Delta Y_{iqgt} = \beta_0 + \beta_1 P_{qgt} + \beta_2 \Delta X_{iqgt} + \beta_3 I_{iqg,2009} + \gamma_g + e_{iqgt} \quad (1)$$

where $\Delta Y_{iqgt} = Y_{iqg,t+1} - Y_{iqg,t}$ for outcome *Y* for individual *i* residing in qism/markaz *q* in governorate *g* in year *t*, P_{qgt} denotes the occurrence of protest and riot events, $\Delta X_{iqgt} = X_{iqg,t+1} - X_{iqg,t}$ for time-varying individual characteristics, $I_{iqg,2009}$ represents baseline individual characteristics, and γ_g represents a vector of governorate fixed effects.

The baseline individual characteristics included in all models are age group (10-12, 13-19, 20-24, 25-29), highest education level attended (never attended, primary, preparatory, general secondary, vocational secondary, and tertiary), a dummy for being enrolled in school, a dummy variable for married versus never married, employment status (employed, unemployed, out of the labor force), religion, household wealth in quintiles as calculated through an asset index, and a variable for the six major geographical zones of Egypt. In addition, we control for several transitions that youth may have gone through between 2009 and 2014 that would affect these core sociodemographic variables. These are transitions in employment status (none, became employed, became unemployed or left the labor force, and entered the labor force but became unemployed), and changes in marriage (none, got married).

All regressions are estimated with linear models. Although some outcomes are binary, we will use linear probability models (LPMs) because nonlinear models with small time dimensions (2) and large numbers of fixed effects (>10,000) can produce biased estimators. Even though the prediction from LPMs may exceed the range of 0-1, we weigh this tradeoff against the potential for bias with nonlinear models. Standard errors are clustered at the qism/markaz level to account for spatial autocorrelation.

3. Results

3.1 Sample characteristics

Table 1 displays the sociodemographic characteristics for our SYPE panel as measured at baseline in 2009. The sample of young women is somewhat older and less educated that young men. Large differences exist for marriage and employment: 36.9% of women were married and 90.6% were not in the labor force. In contrast, only 12.3% of men were married and 38.1% were employed.

Table 1 also shows the prevalence of different transitions occurring between 2009 and 2014. The percentage of young men finishing school was slightly higher than among young women, but school re-entry rates were similar across genders albeit low overall (3.1%-3.6%). Gender differences in employment transitions were more pronounced—23.4% of young men had become employed since 2009 compared to only 6.7% of young women. A small percentage of both groups became unemployed or left the labor force (5.5%-6.7%) or entered the labor force, but failed to find a job (2.9%-3.2%). Slightly higher percentages of young women got married (18.9%) than young men (14.8%).

3.2 Occurrences of riots and protests

Analysis of the ACLED showed that 90% of events in the database (after cleaning) occurred after January 25th, 2011, and 48% of events occurred in 2013 alone, demonstrating a dramatic increase in level of political unrest in the country overall. However, there is substantial geospatial variation in event activity. Figure 1 presents maps of riot and protest activity between 2011 and the date of the SYPE interview in 2013/2014 using the ACLED data. In the first panel we highlight areas that had any events during the period. As can be seen, many qism/markaz did not have any protest or riot activity. As expected, much of the protest activity was concentrated along the more heavily populated areas of the Nile River and Delta, and particularly in urban areas. In the second panel we map the intensity of protest activity, with increasingly darker blue highlighting representing areas with more protest activity. The map shows that qisms/markaz in the urban centers of Cairo and Alexandria had the most protest

activity, although there are also several areas with the Nile Delta and Upper Egypt that had relatively high number of events. We present more detailed analysis of differences in the characteristics of protest versus non-protest areas in Appendix 1.

Table 2 summarizes the number of protest events that occur in the qism/markaz where SYPE respondents reside. The mean number of events was 9.2 among qism/markaz units and 6.7 among individuals. Across 210 qism/markaz in which there were SYPE residents, 42% did not have any occurrence of a protest or riot, which accounts for 37.1% of the individuals in the panel. Given the large proportion of areas and individuals who did not experience any events, the distribution of the number of events is highly skewed. About 31% of qism/markaz experienced events without a single death occurring; only in 27% of qism/markaz did any death occur during the protests and riots that took place.

3.3 Affective outcomes

Table 3 displays overall summary statistics for the levels and changes in levels for all outcome variables, while Tables 4 and 5 display regressions for our main analyses of the effects of protests and riots on young people's outcomes.

Trust

General trust in people increased for both men and women by about 10 percentage points on average. About 18%-19% of individuals expressed an increase in trust whereas 7%-8% expressed a decrease in general trust. Multivariate regression (summarized in Table 4) results indicate that there was an overall increase in trust among men in areas where any event occurred, but a decrease in trust among women; however, neither estimate is statistically significant. A curvilinear relationship emerges according to the number of events whereby trust increases, and significantly so, for 2-4 events among men, before decreasing with more events. Similarly for women, trust initially increases, but then significantly declines with more than five

events. No effects were seen using the measure of occurrences of any deaths during the protests or riots.

Uncertainty

Levels of uncertainty increased slightly between 2009 and 2014, and average of 0.5 points for men and 0.5 points for women. The occurrence of any event increased reported uncertainty for both men and women, but is not statistically significant. In comparison to no events, the occurrence of only one event significantly increased uncertainty among men, with the effect size declining as the number of events increases; among women, uncertainty also increases with the occurrence of 2-4 events, with the effect size similarly declining as the number of events increases. In areas where all events occurred without a death, a significant increase in the uncertainty among men is observed; the effect is also positive for women, but not statistically significant.

3.4 Human capital

Regression results for all human capital outcomes are summarized in Table 5.

Education

On-time school grade completion substantially declined for both men and women: while 70% of men were enrolled in the appropriate grade given their age in 2009, only 22% were at the appropriate grade in 2014; similarly, the 65% of enrolled women who were on-time in 2009 decreases to only 24% in 2014. About half of all school-aged men and 44% of women fell behind in their grade progression. Regression results show that the occurrence of any protest or riot is associated with a reduced likelihood of delayed school completion for both men and women, but is not statistically significant. For the number of events and events with deaths, nearly all effects are near zero and not significant.

The large majority of students experienced at least one absence from school in 2009 (72%-74%), which declined over time by 14 percentage points for men and 9 percentage points for women. No effects of protest and riots on the likelihood of absence are observed for men. For women, there is a significant increase in the likelihood of absence with the occurrence of 2-4 events, which remains positive with 5-19 events before again declining.

The number of days absent from school also declines over time: an average of 4.2 days for men and 2.8 days for women. No significant effects are estimate for any measures of protest and riot events.

Mental health

Individual responses to the SRQ-20 index items are show in Table B1. Certain component items are more prevalent for both young men and women, including having headaches, poor appetite, poor sleep, feeling nervous, trouble thinking clearly, feeling unhappy, and having difficulty making decisions. In general, the prevalence of positive responses to each item is higher among young women than among young men, resulting in a mean summary score of 2.2 and 4.9 for young men and women, respectively, in 2009, indicating that young women have categorically worse mental health (i.e. higher mental health score).

Changes in the mental health summary index across waves shows that mental health improves over time for all individuals on average (i.e., a decrease in the index score). The overall improvement in the summary index for women is relatively larger than it is for men, closing the gender gap, but women still show relatively worse mental health in 2014 when the average index score reduces to 1.6 for men and 2.7 for women.

Mental health scores summarily increase (i.e. worsen) in response to the occurrence of any protest or riot among men, and with larger increases when a death occurs. Effects for women are generally in the opposite direction. No estimates are statistically significant.

Risk behaviors

The reported prevalence of smoking, drinking, and drug use among women is minimal; thus, we exclude women from further analysis of these outcomes. Among men, smoking increases the most over time (27.6% to 35.5%); while 12.4% stop smoking, 20.3% start smoking. The percentage of men who self-report drinking and using drugs is overall very low, and only 2.2% and 4.1% newly start drinking or using drugs over time, respectively. Regression estimates show that the estimated effects of protests and riot events is near zero and insignificant for smoking and drugs. However, the effect of protests and riots on the likelihood of drinking is overall negative, and significant with the occurrence of any event and 5-19 events.

3.5 Sensitivity analyses

We conducted a number of additional analyses to assess the robustness of these results. To account for additional sources of confounding from differences in qism/markaz area characteristics, we add controls constructed from the Egypt 2006 census (i.e. a measure of baseline differences in area characteristics) for literacy (percent of household heads who are literate), labor force participation (percent of men and women who are out of the labor force, percent of men and women who are unemployed), wealth (percent of households in each national wealth quintile), religion (percent Muslim), and population size. Resulting estimates are similar to those of the main specification, but standard errors increase due to the additional degrees of freedom. We choose to exclude these qism/markaz controls from the main regression specification to retain a more parsimonious model.

We also examine the sensitivity of our results to excluding events that occurred after the SYPE 2009 survey, but before the January 25th 2011 revolution. These events may be driven by different political motivations than events related to the revolution and after, and thus may occur in places with different conditions than what the majority of SYPE panel respondents

experienced in their area of residence. This exclusion only affects 138 individuals (1.3%) within the SYPE panel and consequently does not affect the estimated results.

Additional sensitivity analyses are planned to further investigate the following: alternative ways to code events, examining other types of events (e.g., violence against civilians, battles), and regression specifications using logistic linking functions for binary and categorical outcomes.

4. Discussion

Egypt has experienced a dramatic increase in the occurrence of political unrest since 2011, a unique historical period during which a generation of young people are transitioning into adulthood. In this paper, we investigate whether exposure to political unrest – measured through residence in a district where protests and or riots took place – may impact these young people's mental health, investments in education, or engagement in risky behaviors. The preliminary results to do not support our initial hypotheses that exposure to protest events would result in more negative outcomes among young people. Although some of the effects are in the expected direction, others are not, and few are statistically significant. We do see some effect of exposure to protest events on affective outcomes, particularly uncertainty about the future among young men. The results also show some variation by the number of protest or riot events that occurred in the district, our measure for the intensity of exposure to political unrest. Likewise, as expected, effects are different for men and women. Next steps for the analysis are to examine additional subgroup differences, namely between urban and rural youth, and to incorporate measure of young people's own participation in protests from the SYPE in order to test whether this has a mediating effect on their outcomes.

The lack of effect of exposure to political unrest may also be related to the time period during which the SYPE data was collected. Ideally, in order to measure the effects of exposure, we would want outcome data collected, at a minimum, at each point of regime change during

the longer period of political transition. Young people's responses to the January 25th revolution, for example, may have been quite different than their responses to the regime change from President Morsi to the armed forces that occurred shortly before the SYPE was launched. During some periods and for some sub-groups, exposure to protests that brought about these different regime changes may in fact have been a hopeful or empowering experience that – at least in the short term – may have led to positive reactions or improved mental health.

In addition, events in the ACLED may themselves be biased if events reported in non-English media, which may be more locally significant, are excluded. If ACLED events represent higher profile events covered by international media, estimates may be biased toward a null effect. We are also unable to measure proximity to protest events due to the lack of GPS coordinates in the SYPE data. Qisms/markaz vary substantially in size, and so the youth in the SYPE likely live at varying distances from any events that did occur in their area. We will consider these factors, along with the additional analyses noted above, in the final version of the manuscript.

References

Antonovsky, A., & Kats, R. (1967). The Life Crisis History of a Tool in Epidemiological Research. *Journal of Health and Social Behavior*, *8*(1), 15–21. doi:10.2307/2948487

Assaad, R. (2008). Unemployment and youth insertion in the labor market in Egypt. In H. Khayr al-Din (Ed.), *The Egyptian economy: Current challenges and future prospects* (pp. 133–178). Cairo: American University in Cairo.

Axinn, W. G., Ghimire, D. J., Williams, N. E., & Scott, K. M. (2013). Gender, traumatic events, and mental health disorders in a rural Asian setting. *Journal of health and social behavior*, *54*(4), 444–461.

Baker, A. M. (1990). The psychological impact of the Intifada on Palestinian children in the Occupied West Bank and Gaza: An Exploratory Study. *American Journal of Orthopsychiatry*, *60*(4), 496–505. doi:10.1037/h0079207

Baker, A. M. (1991). Psychological Response of Palestinian Children to Environmental Stress Associated With Military Occupation. *Journal of Refugee Studies*, *4*(3), 237–247. doi:10.1093/jrs/4.3.237

Baker, A., & Shalhoub-Kevorkian, N. (1999). Effects of political and military traumas on children: The palestinian case. *Clinical Psychology Review*, *19*(8), 935–950. doi:10.1016/S0272-7358(99)00004-5

Barber, B. K. (2001). Political violence, social integration, and youth functioning: Palestinian youth from the Intifada. *Journal of Community Psychology*, *29*(3), 259–280.

Beusenberg, M., & Orley, J. H. (1994). A User's guide to the self reporting questionnaire (SRQ. http://www.who.int/iris/handle/10665/61113. Accessed 18 July 2016

Binzel, C. (2011). *Decline in social mobility: Unfulfilled aspirations among Egypt's educated youth* (No. No. 6139). 2011: Institute for the Study of Labor (IZA).

Brandt, P. (n.d.). Monthly Global Protests, 1979(1)-2013(6). *Global Database of Events, Language, and Tone (GDELT)*. http://gdeltblog.wordpress.com/2013/07/29/monthly-global-protests-19791-20136/. Accessed 11 January 2014

Cammett, M., & Salti, N. (2016). *Popular Grievances and Perceptions of Socioeconomic Conditions in the Arab Region Prior to the Uprisings* (No. 1006). Cairo: Economic Research Forum.

Campante, F. R., & Chor, D. (2012). Why was the Arab world poised for revolution? Schooling, economic opportunities, and the Arab Spring. *The Journal of Economic Perspectives*, *26*(2), 167–187.

Cohen, F. (1984). Coping. In J. Matrazzo, S. Weiss, J. Herd, N. Miller, & S. Weiss (Eds.), *Behavioural Health: A Handbook of Health Enhancement and Disease Prevention* (pp. 261–270).

Coutts, A., Stuckler, D., Batniji, R., Ismail, S., Maziak, W., & McKee, M. (2013). The Arab Spring and Health: Two Years On. *International Journal of Health Services*, *43*(1), 49–60. doi:10.2190/HS.43.1.d

Dawes, A. (1990). The Effects of Political Violence on Children: A Consideration of South African and Related Studies. *International Journal of Psychology*, *25*(1), 13. Accessed 11 January 2014

Derluyn, I., Broekaert, E., Schuyten, G., & Temmerman, E. D. (2004). Post-traumatic stress in former Ugandan child soldiers. *The Lancet*, *363*(9412), 861–863. doi:10.1016/S0140-6736(04)15734-6

Dhillon, N., & Yousef, T. (Eds.). (2009). *Generation in waiting: The unfulfilled promise of young people in the Middle East*. Washington, D.C.: Brookings Institution Press.

Elbedour, S., Baker, A. M., & Charlesworth, W. R. (1997). The impact of political violence on moral reasoning in children. *Child Abuse & Neglect*, *21*(11), 1053–1066. doi:10.1016/S0145-2134(97)00065-3

Elder, G. H. (1998). The life course as developmental theory. *Child development*, *69*(1), 1–12.
Elder, G. H., & Rockwell, R. C. (1979). The Life-Course and Human Development: An Ecological Perspective. *International Journal of Behavioral Development*, *2*(1), 1–21. doi:10.1177/016502547900200101
El-Mallakh, N., Maurel, M., & Speciale, B. (2015). *Arab Spring Protests and Women's Labor Market Outcomes: Evidence from the Egyptian Revolution* (No. 957). Cairo: Economic Research Forum.
Ferrari, A. J., Charlson, F. J., Norman, R. E., Patten, S. B., Freedman, G., Murray, C. J. L., et al. (2013). Burden of Depressive Disorders by Country, Sex, Age, and Year: Findings from the Global Burden of Disease Study 2010. *PLOS Med*, *10*(11), e1001547. doi:10.1371/journal.pmed.1001547
Ghubash, R., Daradkeh, T., El-Rufaie, O. F., & Abou-Saleh, M. T. (2001). A comparison of the validity of two psychiatric screening questionnaires: the Arabic General Health Questionnaire (AGHQ) and Self-Reporting Questionnaire (SRQ-20) in UAE, using Receiver Operating Characteristic (ROC) analysis. *European Psychiatry*, *16*(2), 122–126. doi:10.1016/S0924-9338(01)00549-1
Hegre, H. avard, Østby, G., & Raleigh, C. (2009). Poverty and Civil War Events A Disaggregated Study of Liberia. *Journal of Conflict Resolution*, *53*(4), 598–623.
Hoffman, M., & Jamal, A. (2012). The youth and the Arab spring: Cohort differences and similarities. *Middle East Law and Governance*, *4*(1), 168–188.
Hogan, D. P., & Astone, N. M. (1986). The transition to adulthood. *Annual review of sociology*, 109–130.
Lazarus, R. S., & Cohen, J. B. (1977). Environmental Stress. In I. Altman & J. F. Wohlwill (Eds.), *Human Behavior and Environment* (pp. 89–127). Springer US. http://link.springer.com/chapter/10.1007/978-1-4684-0808-9_3. Accessed 11 January 2014
Lockhat, R., & van Niekerk, A. (2000). South African Children: A history of adversity, violence and trauma. *Ethnicity & Health*, *5*(3-4), 291–302. doi:10.1080/713667462
Malik, A., & Awadallah, B. (2013). The Economics of the Arab Spring. *World Development*, *45*, 296–313. doi:10.1016/j.worlddev.2012.12.015
Mokdad, A. H., Jaber, S., Aziz, M. I. A., AlBuhairan, F., AlGhaithi, A., AlHamad, N. M., et al. (2014). The state of health in the Arab world, 1990–2010: an analysis of the burden of diseases, injuries, and risk factors. *The Lancet*. doi:10.1016/S0140-6736(13)62189-3
Moussa, S., Kholy, M. E., Enaba, D., Salem, K., Ali, A., Nasreldin, M., et al. (2015). Impact of political violence on the mental health of school children in Egypt. *Journal of Mental Health (Abingdon, England)*, *24*(5), 289–293. doi:10.3109/09638237.2015.1019047
Patel, V., Flisher, A. J., Hetrick, S., & McGorry, P. (14). Mental health of young people: a global public-health challenge. *The Lancet*, *369*(9569), 1302–1313. doi:10.1016/S0140-6736(07)60368-7
Pellillo, A. (2012). Conflict and development: evidence from the Democratic Republic of the Congo. *Unpublished manuscript, available at https://iweb. cergeei. cz/pdf/events/papers/120402_t. pdf (accessed 28 May 2013)*. https://iweb.cerge-ei.cz/pdf/events/papers/120402_t.pdf. Accessed 10 November 2014
Population Council. (2010). *Survey of Young People in Egypt*. Cairo: Population Council.
Punamäki, R.-L., Qouta, S., & El-Sarraj, E. (2001). Resiliency factors predicting psychological adjustment after political violence among Palestinian children. *International Journal of Behavioral Development*, *25*(3), 256–267. doi:10.1080/01650250042000294
Qouta, S., Punamäki, R.-L., Montgomery, E., & Sarraj, E. E. (2007). Predictors of psychological distress and positive resources among Palestinian adolescents: Trauma, child, and mothering characteristics. *Child Abuse & Neglect*, *31*(7), 699–717. doi:10.1016/j.chiabu.2005.07.007

Qouta, S., Punamaki, R.-L., & Sarraj, E. E. (1995). The Relations Between Traumatic Experiences, Activity, and Cognitive and Emotional Responses.... *International Journal of Psychology*, *30*(3), 289. Accessed 11 January 2014

Raleigh, C., Linke, A., Hegre, H., & Karlsen, J. (2010). Introducing ACLED: An Armed Conflict Location and Event Dataset Special Data Feature. *Journal of Peace Research*, *47*(5), 651–660. doi:10.1177/0022343310378914

Rockmore, M. (2011). The Cost of Fear: The Welfare Effects of the Risk of Violence in Northern Uganda. *Households in Conflict Network WP*, *109*. http://www.econ.uconn.edu/seminars/papers/rockmore.pdf. Accessed 10 November 2014

Roushdy, R., & Sieverding, M. (Eds.). (2015). *Panel Survey of Young People in Egypt 2014: Generating Evidence for Policy, Programs and Research*. Cairo: Population Council.

Sadler, K., & Gupta, N. (2014). Adolescent Global Health. In N. Gupta, B. D. Nelson, J. Kasper, & P. L. Hibberd (Eds.), *The MassGeneral Hospital for Children Handbook of Pediatric Global Health* (pp. 121–137). Springer New York. http://link.springer.com/chapter/10.1007/978-1-4614-7918-5_10. Accessed 11 January 2014

Scholte, W. F., Verduin, F., van Lammeren, A., Rutayisire, T., & Kamperman, A. M. (2011). Psychometric properties and longitudinal validation of the self-reporting questionnaire (SRQ-20) in a Rwandan community setting: a validation study. *BMC Medical Research Methodology*, *11*, 116. doi:10.1186/1471-2288-11-116

Seedat, S., van Nood, E., Vythilingum, B., Stein, D. J., & Kamlner, D. (2000). School Survey of Exposure to Violence and Posttraumatic Stress Symptoms in Adolescents. *Southern African Journal of Child and Adolescent Mental Health*, *12*(1), 38–44. doi:10.1080/16826108.2000.9632366

Shanahan, M. J. (2000). Pathways to adulthood in changing societies: Variability and mechanisms in life course perspective. *Annual review of sociology*, 667–692.

Shehata, D. (2012). Youth movements and the 25 January Revolution. In *Arab spring in Egypt: revolution and beyond*. Cairo; New York: The American University in Cairo Press.

Voors, M. J., Nillesen, E. E., Verwimp, P., Bulte, E. H., Lensink, R., & Van Soest, D. P. (2012). Violent conflict and behavior: a field experiment in Burundi. *The American Economic Review*, *102*(2), 941–964.

Whiteford, H. A., Degenhardt, L., Rehm, J., Baxter, A. J., Ferrari, A. J., Erskine, H. E., et al. (2013). Global burden of disease attributable to mental and substance use disorders: findings from the Global Burden of Disease Study 2010. *The Lancet*, *382*(9904), 1575–1586. doi:10.1016/S0140-6736(13)61611-6

Williams, N. E. (2013). How community organizations moderate the effect of armed conflict on migration in Nepal. *Population studies*, *67*(3), 353–369.

Williams, N. E., Ghimire, D. J., Axinn, W. G., Jennings, E. A., & Pradhan, M. S. (2012). A micro-level event-centered approach to investigating armed conflict and population responses. *Demography*, *49*(4), 1521–1546.

Tables

Table 1. SYPE sample characteristics

	Men N=4769	Women N=5477
2009 baseline levels		
Age group		
8-12	21.4%	18.7%
13-19	41.0%	35.6%
20-24	22.0%	25.1%
25-29	15.6%	20.5%
Education		
Never went	19.5%	25.1%
Primary	24.8%	22.1%
Preparatory	18.8%	17.0%
Secondary	7.6%	6.4%
Vocational secondary	21.5%	21.7%
Beyond secondary	7.8%	7.8%
School enrollment		
Out of school	46.8%	56.6%
Currently in school	53.2%	43.4%
Marital status		
Not married	87.7%	63.1%
Married	12.3%	36.9%
Employment status		
Employed	38.1%	6.3%
Unemployed	5.5%	3.1%
Out of the labor force	56.4%	90.6%
Religion		
Muslim	96.9%	96.9%
Christian	3.1%	3.1%
Wealth		
Poorest	17.9%	20.5%
Second	20.5%	21.0%
Middle	23.5%	22.3%
Fourth	21.3%	20.6%
Richest	16.7%	15.6%
Region		
Urban Governorates	21.0%	18.5%
Urban Lower Egypt	11.4%	11.1%
Rural Lower Egypt	33.8%	32.9%
Urban Upper Egypt	6.0%	6.1%
Rural Upper Egypt	22.8%	26.9%
Frontier Governorates	4.9%	4.5%
Transitions between 2009 and 2014		
Changes in schooling		
None	72.9%	76.2%
Finished school	23.5%	20.7%
Re-entered school	3.6%	3.1%
Changes in employment		
None	67.0%	84.6%
Became employed	23.4%	6.7%
Became unemployed or left the labor force	6.7%	5.5%
Entered the labor force, but became unemployed	2.9%	3.2%
Changes in marriage		
No change	85.2%	81.1%
Newly married	14.8%	18.9%

Table 2. Number of protest events occurring between SYPE wave interview dates (2009 – 2013/2014)

	Qism/markaz N=210		Individuals N=10,255	
	Mean	**SD**	**Mean**	**SD**
Number of events	9.20	21.00	6.67	15.32
0	42%		37.1%	
1	14.3%		15.3%	
2-4	15.7%		22.5%	
5-19	14.3%		15.3%	
20+	13.8%		9.8%	
Any event	58.1%		62.9%	
Without a death	31.4%		37.9%	
With a death	26.7%		25.0%	

Table 3. Outcomes by gender

	2009		2014		Change (2014 - 2009)	
Outcome	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
Trust[1]	11.6%	9.1%	21.2%	20.5%		
Decreased					8.3%	7.3%
No change					73.9%	74.0%
Increased					17.9%	18.7%
Uncertainty level[1]	6.7	6.5	7.2	6.9	0.5	0.4
School level on-time completion[2]	70.0%	65.3%	21.8%	24.4%		
Caught up					2.6%	3.5%
On-time/no change					46.5%	52.0%
Became delayed					50.8%	44.4%
Ever absent from school[2]	73.9%	59.8%	72.1%	63.0%	-14.2%	-9.0%
Days absent from school[2]	6.3	5.6	10.5	8.4	4.2	2.8
Mental health SRQ-20 score[1]	2.2	4.9	1.6	2.7	-0.6	-2.2
Smoking	27.6%	0.1%	35.5%	0.3%		
Stopped smoking					12.4%	0.1%
Never smoked					67.3%	99.6%
Started to smoke					20.3%	0.3%
Drinking[1]	1.4%	0.1%	2.3%	0.2%		
Stopped drinking					1.3%	0.1%
Never drank					96.5%	99.7%
Started drinking					2.2%	0.2%
Drugs[1]	2.6%	0.1%	4.3%	0.1%		
Stopped drugs					2.3%	0.1%
Never did drugs					93.6%	99.8%
Started using drugs					4.1%	0.1%

*** p<0.01, ** p<0.05, * p<0.1

[1]Restricted to youth aged 15+ in 2009 to whom these questions were asked.

[2]Restricted to youth in school at time of survey.

Table 4. Estimated effects of riot and protest event occurrences on perceptions of trust and uncertainty

	Trust		Uncertainty	
Outcome	**Male**	**Female**	**Male**	**Female**
Any event	0.0382	-0.0130	0.293	0.111
	[0.0284]	[0.0239]	[0.154]	[0.138]
Number of events				
1	0.0428	0.0136	0.646**	-0.0308
	[0.0356]	[0.0317]	[0.186]	[0.167]
2-4	0.0853*	0.0233	0.439*	0.279*
	[0.0347]	[0.0296]	[0.197]	[0.156]
5-19	-0.0212	-0.0715*	-0.155	0.0980
	[0.0354]	[0.0302]	[0.193]	[0.169]
20+	-0.00169	-0.1000	-0.191	-0.0219
	[0.0426]	[0.0543]	[0.297]	[0.243]
Occurrence of deaths				
All events without a death	0.0471	-0.00830	0.431**	0.152
	[0.0313]	[0.0244]	[0.160]	[0.146]
Any event with a death	0.0191	-0.0229	-0.00697	0.0255
	[0.0309]	[0.0330]	[0.198]	[0.160]
Observations	3,259	3,971	3,259	3,973
R-squared	0.076	0.115	0.165	0.158
Sample limits	Age 15+ in 2009		Age 15+ in 2009	

** p<0.01, * p<0.05; robust standard errors in brackets, clustered by kism/markaz
All regressions include controls for individual characteristics measured in 2009, changes in marital status and employment between 2009 and 2014, and governorate fixed effects

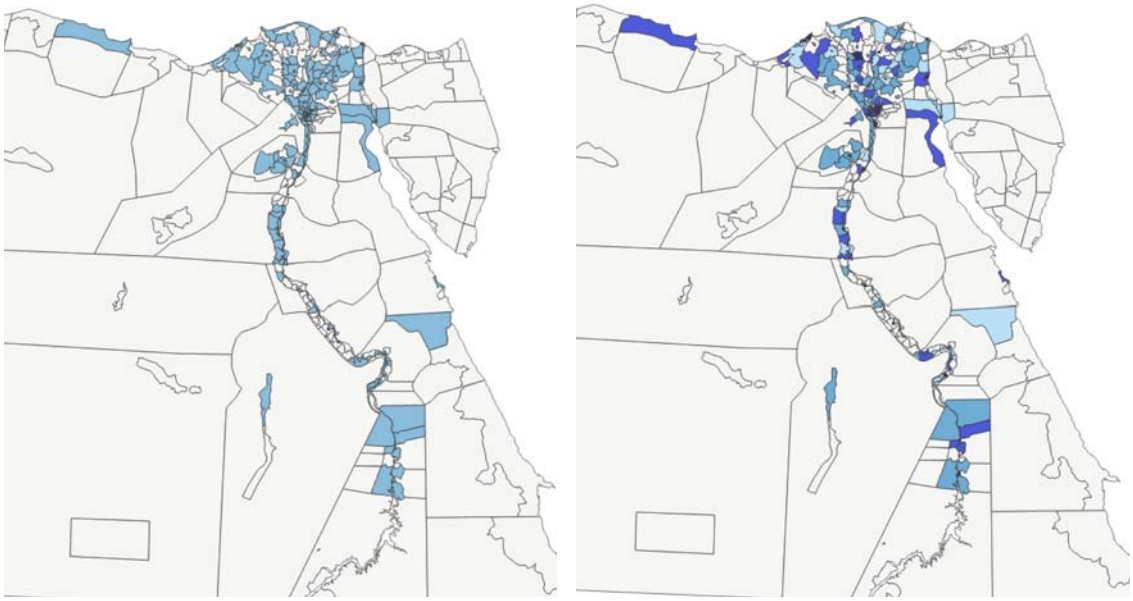
Table 5. Estimated effects of riot and protest event occurrences on schooling, mental health, and risk behavior outcomes

	Delayed school completion		Ever absent from school		Days absent from school		Mental health SRQ-20 score		Smoking	Drinking	Drugs
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Outcome	Male	Female	Male	Female	Male	Female	Male	Female			
Any event	-0.0170	-0.0131	-0.0301	0.0621	-0.774	-0.383	0.218	-0.232	0.00154	-0.0147*	-0.00225
	[0.0249]	[0.0234]	[0.0400]	[0.0511]	[1.386]	[1.425]	[0.210]	[0.311]	[0.0200]	[0.00681]	[0.0144]
Number of events											
1	0.00782	-0.00899	-0.0555	-0.0143	1.279	2.667	0.434	-0.258	-0.0221	-0.0115	-0.0112
	[0.0332]	[0.0323]	[0.0557]	[0.0692]	[1.804]	[1.750]	[0.287]	[0.385]	[0.0229]	[0.00877]	[0.0159]
2-4	-0.0471	-0.0277	-0.0555	0.117*	-1.141	-1.810	0.336	0.0507	0.0135	-0.0137	-0.0119
	[0.0326]	[0.0305]	[0.0502]	[0.0568]	[1.956]	[2.080]	[0.283]	[0.350]	[0.0254]	[0.00788]	[0.0171]
5-19	0.00838	-0.00341	0.0320	0.106	-3.046	-0.772	-0.189	-0.457	0.0183	-0.0216*	0.0139
	[0.0368]	[0.0332]	[0.0584]	[0.0546]	[1.796]	[1.739]	[0.308]	[0.442]	[0.0317]	[0.00913]	[0.0208]
20+	-0.0742	0.00611	-0.0458	-0.0257	-3.884	-4.886	0.287	-0.692	-0.0262	-0.00732	0.0237
	[0.0434]	[0.0378]	[0.0913]	[0.0871]	[2.539]	[2.730]	[0.399]	[0.574]	[0.0384]	[0.0145]	[0.0223]
Occurrence of deaths											
All events without a death	-0.0254	-0.0167	-0.0513	0.0669	-0.0699	0.434	0.136	-0.211	0.00700	-0.0133	-0.00443
	[0.0268]	[0.0247]	[0.0402]	[0.0553]	[1.570]	[1.523]	[0.232]	[0.303]	[0.0215]	[0.00700]	[0.0148]
Any event with a death	0.000993	-0.00467	0.0109	0.0508	-2.476	-2.352	0.395	-0.277	-0.00985	-0.0179	0.00247
	[0.0330]	[0.0315]	[0.0560]	[0.0590]	[1.606]	[1.899]	[0.288]	[0.433]	[0.0266]	[0.00940]	[0.0183]
Observations	2,950	2,968	1,349	1,203	417	366	3,263	3,979	4,767	3,214	3,286
R-squared	0.287	0.206	0.122	0.119	0.164	0.108	0.127	0.071	0.053	0.021	0.028
Sample limits	In school		In school		In school		Age 15+ in 2009		Male, age 15+ in 2009		

** p<0.01, * p<0.05; robust standard errors in brackets, clustered by kism/markaz

All regressions include controls for individual characteristics measured in 2009, changes in marital status and employment between 2009 and 2014, and governorate fixed effects

Figure 1: Map of protest activity



In panel A areas with any protests are highlighted in blues. In panel B areas with more protest are highlighted in increasingly darker shades. The categorizations in panel B follow those in the text (0, 1, 2-4, 5-19, 20+).

Appendix A: Examining pre-existing differences in areas with protest activity

A concern in our empirical strategy is that preexisting differences and time-varying area level factors are related to both protest activity and our outcomes of interest. In this appendix, we compare the pre-existing characteristics of locations with any protest using the 10% sample of the 2006 census.

In Appendix Table 1, we present mean area level characteristics of qism/markaz that had no protests and those that had one or more protests during the study period. Places that had any protest are larger, more urban, are richer, have more men out of the labor force and have less educated heads of households. Many of these differences are correlated and likely driven by the large difference in urbanization across governorates.

In Appendix Table 2, we present multivariate relationship between the areas with protests and the 2006 census characteristics. As in the main specification presented in Tables 4 and 5, we control for governorate level fixed-effects. In column 1 of Appendix Table 2, the outcome is the total number of events. In column 2 of Appendix Table 2, the outcome is having any events. For both outcomes the distributional properties are not ideally modeled linearly (total events are highly skewed and any events is a binary outcome), therefore these regressions are meant only to show which pre-existing characteristics remain different after controlling for other factors. Richer areas were more likely to have more protest events. More populated areas and areas with more educated heads of households were more likely to have any events. The small remaining differences suggest that we need minimal controls to account for baseline differences in protest areas. In all models presented in the main text both *individual* wealth and education are accounted for.

Appendix Table 1: Mean area-level characteristics of Qism/Markaz, by protest activity

2006 Census Characteristic	No Protests N=128	Any Protests N=158
Population *	21807	27336
Education *		
Head of household Literate	41%	35%
Urban *	40%	63%
Youth Employment*		
Percent 15-30 Female NILF	85%	83%
Percent 15-30 Male NILF	41%	45%
Percent 15-30 Female Unemployed	6%	7%
Percent 15-30 Male Unemployed	11%	11%
Religion		
Muslim	95%	94%
Wealth *		
Poorest	34%	23%
2nd Poorest	20%	18%
Middle	12%	10%
2nd Richest	19%	21%
Richest	15%	29%

* Denotes statistically significant differences across areas

Appendix Table 2: Area-level predictors of protest events

	Total Events	Any events
Population	0.0000735	7.46e-06**
	[-0.000122 - 0.000269]	[4.12e-06 - 1.08e-05]
Education		
Head of household Literate	37.49	1.086*
	[-16.07 - 91.04]	[0.0204 - 2.152]
Urban		
	4.798	0.242
	[-7.844 - 17.44]	[-0.0380 - 0.522]
Employment		
Percent 15-30 Female NILF	-28.7	-0.701
	[-132.3 - 74.86]	[-2.202 - 0.799]
Percent 15-30 Male NILF	52	0.356
	[-44.74 - 148.7]	[-0.686 - 1.398]
Percent 15-30 Female Unemployed	-182.9	-0.71
	[-506.3 - 140.4]	[-5.023 - 3.602]
Percent 15-30 Male Unemployed	26.1	-0.679
	[-83.80 - 136.0]	[-3.321 - 1.963]
Religion		
Muslim	38.31	-0.667
	[-40.57 - 117.2]	[-1.893 - 0.560]
Wealth		
2nd Poorest	-10.18	-0.49
	[-71.78 - 51.42]	[-1.556 - 0.576]
Middle	13.94	1.452
	[-44.52 - 72.41]	[-0.276 - 3.180]
2nd Richest	30.29	0.537
	[-60.63 - 121.2]	[-0.683 - 1.758]
Richest	77.20**	0.989
	[19.77 - 134.6]	[-0.152 - 2.130]
Constant	-58.97	0.661
	[-165.6 - 47.69]	[-1.554 - 2.876]
Observations	284	284
R-squared	0.268	0.304
Gov FE	YES	YES

Robust ci in brackets
** p<0.01, * p<0.05

Appendix B: Mental health index items

Table B1. Self-reporting questionnaire (SRQ-20) responses, Survey of Young People in Egypt panel (2009, 2014)

		Men N=3316		Women N=4065	
		2009	2014	2009	2014
SRQ-20 items					
1	Do you often have headaches?	25.3%	19.2%	47.9%	24.8%
2	Is your appetite poor?	17.3%	13.5%	31.7%	17.9%
3	Do you sleep badly?	15.5%	16.7%	32.7%	20.9%
4	Are you easily frightened?	7.3%	6.2%	40.6%	22.7%
5	Do your hands shake?	11.1%	4.8%	15.2%	6.5%
6	Do you feel nervous, tense or worried?	28.4%	18.1%	42.4%	23.3%
7	Is your digestion poor?	9.0%	6.2%	21.7%	9.4%
8	Do you have trouble thinking clearly?	17.5%	10.5%	26.7%	16.5%
9	Do you feel unhappy?	17.1%	8.6%	23.9%	12.2%
10	Do you cry more than usual?	4.1%	3.1%	22.8%	13.3%
11	Do you find it difficult to enjoy your daily activities?	12.6%	8.7%	21.4%	12.7%
12	Do you find it difficult to make decisions?	18.6%	9.5%	26.2%	18.8%
13	Are you unable to resume your daily work?	7.1%	5.0%	17.5%	9.1%
14	Are you unable to play a useful part in life?	8.0%	5.7%	17.6%	8.5%
15	Do you lose interest in things?	8.8%	9.1%	14.6%	12.8%
16	Do you feel that you are a worthless person?	3.1%	4.7%	11.2%	6.8%
17	Has the thought of committing suicide been on your mind?	2.0%	2.9%	9.8%	3.9%
18	Do you feel tired all the time?	5.7%	4.9%	22.7%	9.4%
19	Do you have uncomfortable feelings in your stomach?	5.8%	4.8%	18.5%	8.5%
20	Are you easily tired?	5.2%	5.7%	24.4%	14.8%
Summary index		**2.29**	**1.68**	**4.90**	**2.73**